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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

Analysis of the Transitioning Opportunity for Non-Traditional Firms Under Other Transaction Authority

By: **Lin Liu**
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June 2008

Advisors: **E. Cory Yoder**
Mark J. Eitelberg

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REPORT DOCUMENTATION PAGE
Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE June 2008	3. REPORT TYPE AND DATES COVERED MBA Professional Report
4. TITLE AND SUBTITLE: Analysis of the Transitioning Opportunity for Non-Traditional Firms Under Other Transaction Authority		5. FUNDING NUMBERS
6. AUTHOR(S) Lin Liu and James Y. Wong		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this report are those of the author(s) and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited	12b. DISTRIBUTION CODE
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13. ABSTRACT (maximum 200 words)

The Federal Government no longer dominates defense and space-based technologies as it once did. This is due to the diminishing role of Federal Government as the lead developer and owner of advance technologies. What began in the 1980s with private industry starting to outspend Federal Government in Research & Development has resulted in significant technological innovations in commercial companies. As a result, Government turned to private industry to access commercially developed technology. One procurement instrument, Other Transaction Authority for Prototype Development (OTAs), was authorized by Congress to help enable the Department of Defense (DoD) and other Government agencies to form business arrangements with traditional and non-traditional firms to develop weapon systems and related products. While this prototyping authority has provided non-traditional firms the opportunity to conduct business with DoD, there is limited information available on whether these projects have provided transition opportunities for follow-on production. This research examines the transition opportunities available to non-traditionals who have completed an OTA for prototyping.

14. SUBJECT TERMS Other Transaction Authority, Other Transaction Authority for Prototype Development, OTA, Section 845, Prototyping, Non-Traditional Defense Firms, Chemical Biological Radiological Technology Alliance, Rosettex, DFARS Subpart 212.70			15. NUMBER OF PAGES 131
16. PRICE CODE			
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU

NSN 7540-01-280-5500

 Standard Form 298 (Rev. 2-89)
 Prescribed by ANSI Std. Z39-18

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**ANALYSIS OF THE TRANSITIONING OPPORTUNITY FOR NON-
TRADITIONAL FIRMS UNDER OTHER TRANSACTION
AUTHORITY**

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MASTER OF BUSINESS ADMINISTRATION

from the

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The Federal Government no longer dominates defense and space-based technologies as it once did. This is due to the diminishing role of Federal Government as the lead developer and owner of advance technologies. What began in the 1980s with private industry starting to outspend Federal Government in Research & Development has resulted in significant technological innovations in commercial companies. As a result, Government turned to private industry to access commercially developed technology. One procurement instrument, Other Transaction Authority for Prototype Development (OTAs), was authorized by Congress to help enable the Department of Defense (DoD) and other Government agencies to form business arrangements with traditional and non-traditional firms to develop weapon systems and related products. While this prototyping authority has provided non-traditional firms the opportunity to conduct business with DoD, there is limited information available on whether these projects have provided transition opportunities for follow-on production. This research examines the transition opportunities available to non-traditionals who have completed an OTA for prototyping.

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LIST OF ACRONYMS AND ABBREVIATIONS

AAS	Advisory and Assistance Services
CAS	Cost Accounting Standards
CBR	Chemical, Biological and Radiological
CBRTA	Chemical, Biological, & Radiological Technology Alliance
CG	Comptroller General
CIA	Central Intelligence Agency
COSSI	Commercial Operations and Support Savings Initiative
DARPA	Defense Advanced Research Projects Agency
DDR&E	Director, Defense Research & Engineering
DFARS	Defense Federal Acquisitions Regulation Supplement
DHS	Department of Homeland Security
DoC	Department of Commerce
DoD	Department of Defense
DoT	Department of Transportation
EELV	Evolved Expendable Launch Vehicle
FARA	Federal Acquisition Reform Act of 1996
FASA	Federal Acquisition Streamlining Act of 1994
FCS	Future Combat Systems
GAO	Government Accountability Office
IG	Inspector General's Office
IP	Intellectual Property
IR&D	Independent Research & Development
LMI	Logistics Management Institute

NASA	National Aeronautics and Space Administration
NDAA	National Defense Authorization Act
NGA	National Geospatial-Intelligence Agency
NGO	Non-Governmental Organization
O&S	Operations & Support
OTs	Other Transactions (to include both OTA and TIA)
OTA	Other Transaction Authority for Prototype Development (also referred as Acquisition OTs)
R&D	Research & Development
RDT&E	Research Development Test & Evaluation
SBIR	Small Business Innovation Research
TIA	Technology Investment Agreements (also referred as Cooperative Agreements and Other Transactions for Research)
USC	United States Code
FY	Fiscal Year

I. INTRODUCTION

A. GENERAL

The Federal Government's role as the lead developer and owner of advance technologies has steadily diminished over time. One key reason is the widening of Research & Development (R&D) spending between Government and private sources. Since the 1990s, federally sponsored R&D has decreased by an average of 1.2 percent per year, whereas those efforts funded by private industry grew an average of 6.2 percent annually (*Federal Support for Research and Development*, 2007, p. 3). Figure 1 provides a graphical depiction. Significant technological innovations now take place in the private sector as the commercial marketplace rewards these firms with greater return on investment and higher profit. As a result, the Government no longer holds the dominant position in technology for defense and space-based purposes that it once enjoyed in areas such as nuclear energy, jet engines, radar, and micro-electronics (Dunn, 2005, p. 6).

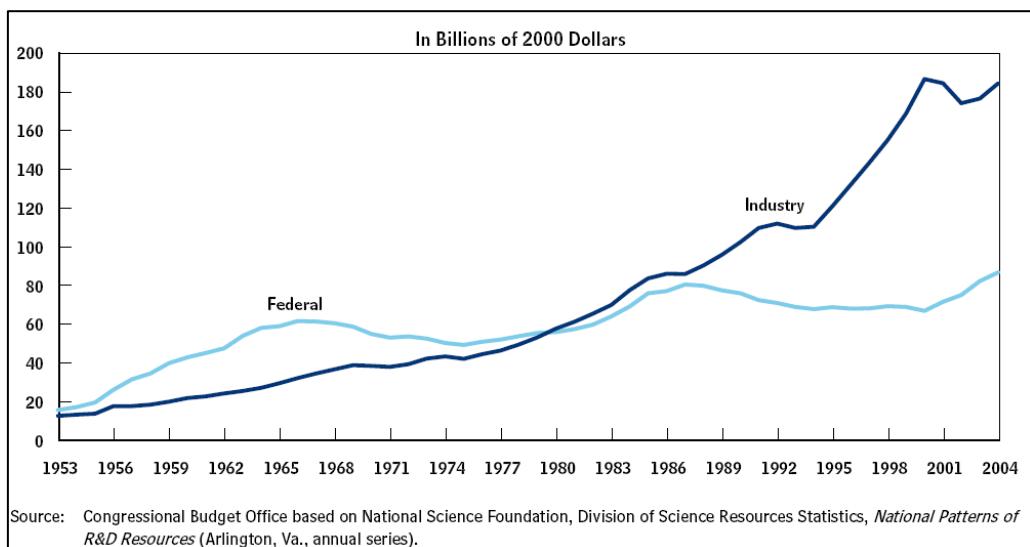


Figure 1. U.S. Spending for R&D from 1953 to 2004 by Source (From: *Federal Support for Research and Development*, 2007, p. 2)

The Government recognized the importance of leveraging commercial sources for their R&D capability and expertise; therefore, they needed to go outside traditional

defense sources to acquire certain “cutting edge” technologies from the commercial marketplace to support operational requirements. The July 1993 Defense Science Board Report provides an example for adopting a more commercial approach in order to attain significant cost, schedule, and performance reductions and improvements:

Motorola developed STU-III Secure Telephone. In the '80s, Motorola was selected to build the STU-III secure communications terminal on the basis of development of a dual use commercial product. The development took 3 years compared to an estimated 7-11 year “normal” DoD cycle, and cost an estimated one-tenth a DoD military specified item. (p. 18)

To capitalize on these opportunities, defense reform initiatives from the Federal Acquisition Streamlining Act of 1994 (FASA) and the Federal Acquisition Reform Act of 1996 (FARA) were enacted to simplify the Federal Acquisition Regulation (*FAR*) by reducing procurement regulations and promoting the use of commercial acquisition. Dual-use programs were also developed and funded under the Clinton administration to benefit the military and civilian marketplace (Reppy, 2000, p. 6).

Despite the efforts set forth by Government to access R&D from private industry, these companies must also be willing participants in the process as well. Unfortunately, indications reveal that private industry maintains reservations about providing R&D solutions to the Government. The most astounding analysis about industry came from an article titled “Leading Commercial Firms Shun DoD and R&D” (1994) by management consultant Robert Spreng. By comparing DoD Research Development Test & Evaluation (RDT&E) with those of *Business Week* and *Fortune 500*, Spreng discovered 95 percent of the industry group leaders with the greatest percentage of sales invested in R&D received insignificant or no DoD RDT&E awards (Memorandum of Law, 1996, p. 9). Spreng concluded:

Commercial firms will offer the government significantly more of the needed technologies, some right off the laboratory shelf, when the Government can make available adequate protection for commercially oriented intellectual property and the use of existing commercial accounting methods for R&D. (Ibid, 1996, p. 9)

A more recent study by the Department of Commerce (DoC) Bureau of Industry and Security, with Trotta Associates (2003), revealed similar findings to Spreng when assessing private companies' attitudes toward sharing new commercial technologies with the DoD. This study analyzed 431 responses of companies in four technology fields, discovering that many companies were still reluctant to discuss R&D programs with DoD and citing the following reasons:

- Procurement complexity that includes added regulations and bureaucracy, contributing to higher operating costs;
- Financial incentives are not obvious since Federal budget are affected by political factors, regulations that limited profitability, and prohibition on long-term relationships;
- Communication difficulties between private firms and the Government;
- Believed Government will mismanage intellectual property (IP) and result in losing a company's competitive advantage;
- Potential for product irrelevance in providing to the Government, and
- Concerns from small business in not being able to comply with cost and administrative requirements (Trotta, Air Force, & Department of Commerce, 2003, pp. 1-5).

B. CONCEPT OF OTA

Other Transaction Authority for Prototype Development (OTA) was established by Section 845 granting specific authority to Defense Advanced Research Projects Agency (DARPA) and then to DoD military services. This authority allowed certain government agencies to engage with industry through formal agreements outside standard procurement contracting regulations in order to access commercial or private industry technologies to develop prototypes of weapon systems or weapon related components (See Chapter II for detailed OTA Historical Legislation).

1. Benefits

Many of the challenges—as identified in the preceding paragraphs—for Government in seeking to conduct business with private industry can be resolved with the OTA as an alternative procurement tool. OTAs can enable the DoD and other

Governmental entities to attract these companies (i.e., non-traditional firms) to participate and provide their technological capabilities and expertise in producing innovative and advanced prototypes of weapons systems or components. They are most appropriate for projects that provide joint development of products with future market potential (i.e., dual-use technology), necessary flexibility given the high-risk nature associated with these projects, and provide the opportunity for DoD to benefit from innovative business relationships (Smith, Drezner, Lachow, & National Defense Research Institute, 2002, p. 33). In general, an OTA instrument provides the Government and industry enormous flexibility by:

- Allowing unique arrangements in the way IP is managed where the Bayh-Dole Act is not applicable;
- Bypassing most procurement regulations and statutes like the Truth in Negotiations Act;
- Reducing much of the administrative and cost oversight associated with Government contracts such as Cost Accounting Standards (CAS); and
- Permitting the use of creative agreement structures to maximize performance between Government and private industry.

These benefits as well as others have been documented by various Government and Government-sponsored reports. A 2000 report to Congress reported benefits to include “attracting firms that typically did not contract with DoD, enabling use of commercial products or processes, providing more flexibility to negotiate agreement terms and conditions, and reducing program costs” (Acquisition reform: DoD's guidance on using Section 845 agreements, 2000, p. 4). A 2002 Government Accountability Office (GAO) report surveyed agreement officers who conducted OTAs to determine the benefits from a user standpoint. The results of this survey are shown in Figure 3. As seen here, three benefits stand out: use commercial technologies or practices, attract commercial firms, and flexibility in negotiating terms and conditions.

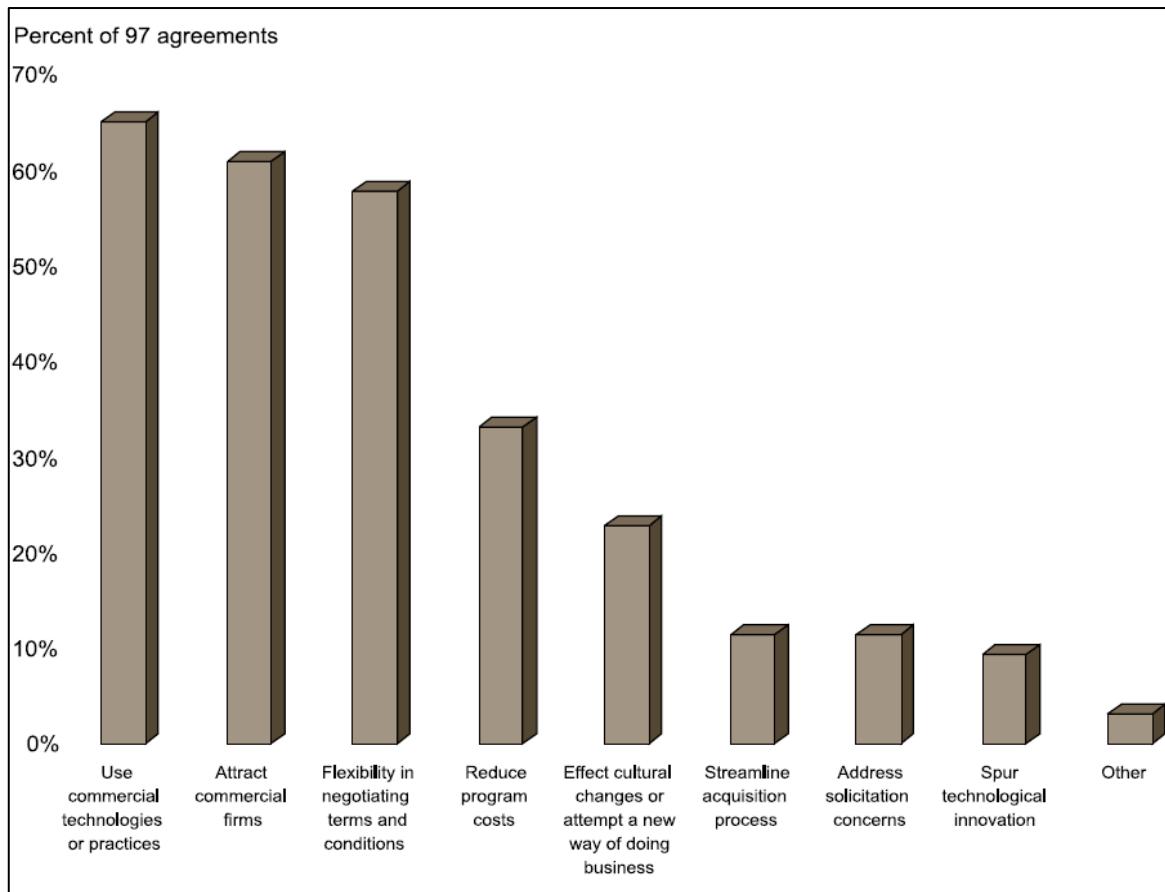


Figure 2. Reasons Cited by DoD Components for Using OTAs, 1999 Survey (From: Acquisition reform: DoD's guidance on using Section 845, 2000, p. 13)

RAND (2002) assessed 21 out of 72 OTA projects conducted during the 1994-1998 timeframe. The RAND study found OTAs provided benefits that went beyond the expansion of the industry base even though evidence of new companies entering to do business with DoD was few (Smith et al., p. 17). The assessment documented the following benefits: (1) New activity from large suppliers (e.g., Motorola, 3M, Lucent, Eastman Kodak, Oracle, and others) who previously focused on commercial projects were more willing to work for DoD under an OTA; (2) Change and adaptability are inherent to the OTA process, so the agreement usually contains a clause stating “that any time progress or results indicate that a change would be beneficial to project objectives, such a change can be made through mutual agreement of DoD and industry managers,” providing better use of industry resources and management of risks; (3) The objectives of

an OTA are stated in terms of general goals vice specifications, allowing for greater creativity with progress payment incentives contingent on successful completion of a milestone event; (4) Innovative arrangements (e.g., negotiate independently, industry partnership via informal consortium, progress payments to satisfactory completion of milestone events, direct involvement with prime contractor and subcontractors) can result since circumstances surrounding each agreement are unique; and (5) OTA procedures can yield more value per DoD dollar invested by leveraging private investment through cost-risk-benefit sharing, reducing transaction and overhead costs, providing more authority in Government/industry management team, and allowing significant cost avoidance (Ibid., pp. 15-24).

A 2007 Logistics Management Institute (LMI) analysis on Other Transactions also reported positive benefits on OTAs based on interviews, case studies, and questionnaire respondents. In general, the LMI report placed the OTA benefits in five categories: (1) Streamlining and flexibility; (2) Performance improvements; (3) Schedule reductions; (4) Cost reductions; and (5) Participation by non-traditional defense contractors in which 84 percent of all OTAs awarded in FY01-FY05 had significant participation by non-traditionals (Ablard et al., 2007, Ch. 2, pp. 2-9).

2. Concerns

There have been concerns with using OTAs since they do not need to conform to normal controls and oversight standards found in traditional *FAR*-based contracts. As a result, it is believed that DoD's interests may be fall victim to greater costs and risks. RAND (2002) identifies a number of concerns from its assessment:

- DoD's loss of intellectual property right;
- Its loss of cost standards; and
- Inability to establish metrics to measure OTA success (e.g., cost, performance, and schedule) (Smith et al., 2002, pp. 9-10, 25-29).

Overall, the RAND report determined that the Government's risk is limited in utilizing OTAs despite a few programs where oversight was reduced and the understanding that the associated risks cannot be completely assessed at the time of the report (Ibid., 2002, pp. 31-32).

C. OBJECTIVES OF THE RESEARCH

The purpose of this report is to explore the opportunities available for non-traditional companies to transition their completed prototype project for follow-on production with DoD. Prototype development under OTA provides non-traditional firms the ability to compete for DoD awards and not be subject to numerous regulations and contracting requirements associated with *FAR*, legislation imposed by Congress, and cost accounting principles. While OTAs provide opportunities for non-traditional firms to compete for prototype weapons, the transition to production and support is conditioned by what is allowable under regulations (i.e., *FAR* and Defense Federal Acquisition Regulation Supplement (*DFARS*)). Since it has been approximated that 80 percent of lifecycle costs of a weapons acquisition program reside in the operations and support (O&S) aspects, it is possible that the production and sustainment of a weapons system provide greater profit potential.

D. RESEARCH QUESTIONS

1. Primary Research Question

To what extent have transition opportunities been made available to and utilized by non-traditional firms to extend their completed prototype under the OTA to DoD production?

2. Secondary Research Questions

What aspects of the OTA attract the non-traditional firms to do business with the Government?

What are the transitioning opportunities experienced by the non-traditional firms that have conducted OTA agreements?

What are the transitioning opportunities available and used by DoD officials?

What are the barriers, if any, encountered by the non-traditional firms that limit transitioning opportunities?

E. SCOPE AND METHODOLOGY

This research looks at the transition opportunities available to non-traditionals that have completed an OTA for prototyping. To assess the efficacy of different opportunities afforded by Congress through legislation, statutes, and regulations provided in the *FAR*, an electronic survey is used on a sample set of non-traditional firms that have utilized OTAs. Interviews with DoD and industry officials who have extensive experience and knowledge in the subject matter are also utilized to determine if current practices in OTA are satisfactory or require improvements to enable greater participation from non-traditional firms.

F. ORGANIZATION OF THE RESEARCH

This thesis consists of five chapters. Chapter I briefly introduces the concept of OTA and purpose of the research. Chapter II provides extensive background on OTAs, including literature review on previous OTA analyses, the macro environment, the legislative history, and an overview of alternative programs that also offer prototyping outside standard procurement procedures. Chapter III provides transition opportunities for OTAs as well as two unique models whose processes may result in follow-on production. Chapter IV summarizes the analysis of survey results (non-traditional firms) and interviews with DoD and industry officials. Chapter V presents conclusions and recommendations, and identifies areas for future study.

II. BACKGROUND

A. INTRODUCTION

This chapter provides a general background that is relevant to the analysis of follow-on opportunities for non-traditional firms with completed OTA projects. This chapter begins with a detailed literature review of previous analyses conducted on OTAs. The researchers also examine the current macro-environment with a strategic analysis of the defense industry, indicating why the OTA authority is a necessary tool for procuring critical technologies from private industry. This chapter then reviews OTA legislative history and alternative programs to OTAs available in DoD.

B. PREVIOUS ANALYSES

Prior analyses have been conducted on OTA authority as theses, journal articles, and private institution studies on behalf of DoD. The majority of the studies tend to examine the efficacy of OTA, focusing on the benefits and limitations to DoD and industry participants. The exceptions are Hayes (1998), who developed a model to assist in determining if an OTA is the proper procurement agreement for DoD buying activities, and Stamatopoulos (1999), who attempted to develop standard metrics to monitor OTAs.

The most recent study was completed in 2007 by the Logistics Management Institute (LMI), a Government-focused consulting group, which gathered information on the recent usages of both types of Other Transactions (OTs) from multiple sources, including questionnaires, case studies, and interviews as well as different literature and databases. The study's purposes are described as follows:

...to gather a comprehensive body of information about recent usage of these instruments, look into the parameters for their use, and assess their value in the current environment...to develop an up-to-date overview of their use; the successes, best practices, and benefits realized through their use; and their limitations. (Ablard et al., 2007, p. iii)

Overall, the LMI study is very extensive and offers positive feedback from DoD respondents on the use of these instruments due to their flexibility, performance improvements, schedule reductions, cost reductions, and access to non-traditional firms. It highlights to DoD that OTs are valuable and should be maintained, and even expanded, for the purposes of research and prototyping to transition critical technologies from non-traditional sources (Ibid, 2007). This analysis revealed the significant use of non-traditional firms participating to a significant degree in new prototype awards from FY2001-FY2005 (See Table 1).

Table 1. Level of Participation by Non-Traditionals in OTAs from FY 2001-2005
(From: Ablard et al., 2007, p. E-1)

Item	FY01	FY02	FY03	FY04	FY05	Total
Total number of new prototype awards	64	54	54	50	78	300
Awards with significant NT participation						
Number of awards	45	42	46	45	74	252
Percentage of awards	70%	78%	85%	90%	95%	84%
Notes:						
1. Three actions included in the FY02 report to Congress were FY01 actions that were inadvertently excluded from the FY01 report. On this chart, these actions are counted in the FY01 figures.						
2. The FY02 report language specifies that two new master agreements (NMA401-02-9-2001 and NMA401-02-9-2002) should not be counted as new agreements. The two actions are included in the total for FY02, but not in the new awards figure.						

Contrary to the finding of non-traditional involvement presented in the LMI Report, Hanson's (2005) analysis determined that OTAs have not met the intent of Congress in providing DoD access to non-traditional firms for private sector R&D. His report examines all agreements documented in the DoD's Annual Report to Congress on all OTs for FY1997-FY2003, and categorizes the amounts awarded to recipients on the basis of firm type (e.g., non-traditional, major defense contractor, etc.) (p. 4). His research is limited to data derived primarily from the Annual Reports; therefore, the methodology to categorize award amounts by firm type is not entirely accurate for two reasons. First, the analysis neither accounted for nor distinguished the various kinds of organizations involved in the alliances and consortiums formed to develop a prototype or to conduct research. For example, the OTA agreement between the Chemical,

Biological, & Radiological Technology Alliance (CBRTA) and National Geospatial-Intelligence Agency (NGA) consists of approximately a dozen firms whose membership includes traditional defense, commercial, academic, and nonprofit organizations (OTA Agreement between CBRTA and NGA, 2007, pp. 2-5). Additionally, the funding amounts within an alliance are difficult to characterize and not verifiable given the complexity of the arrangements for each prototype developed. Further, there are agreements awarding a large defense contractor with non-traditional involvement who provided a significant effort to the OTA.

A 2002 RAND briefing offers a qualitative assessment of 21 sample OTA projects out of a total of 72 conducted in the 1994-1998 timeframe. This report examines the general characteristics of OTA agreements, the benefits of using them, disadvantages that were encountered in terms of protecting DoD interests, and a determination of the net effects in comparing their advantages and disadvantages. The assessment produces three conclusions that the RAND researchers considered as subjective. First, OTAs expanded the industry base for DoD with commercial and private firms that are more willing to participate because they find these arrangements less restrictive. Second, the OTA process provides a broad range of benefits to include improved use of industry resources and better risk management for DoD. Further, the immediate rewards outweigh the inherent risks associated with OTAs due to less oversight requirements (Smith et al., 2002, pp. vii-ix).

Bloch and McEwen (2002) published a journal article that highlights the problems for Government in attracting high-technology companies to conduct business. They state that the issues stem primarily from the differences between Government and private industries' approaches to intellectual property (IP), primarily over the treatment of IP rights when they are Government-funded (therefore affording the Government "march-in" rights per the Bayh-Dole Act). To help the Government in acquiring high-technology solutions from private firms, they recommend applying non-traditional methods, in particular the OTA that are not subject to *FAR* and other procurement statutes (pp. 196-199, 209-210).

Gilliland (2001) assesses OTAs to determine whether these instruments have been effective in attracting non-traditional participation to do business with DoD. His findings show that OTAs have attracted non-traditional firms, though participation of traditional defense contractors in these arrangements was still substantial (Gilliland, 2001, pp. 66-70). Note that only Gilliland's thesis ventures to determine if non-traditional firms performed follow-on work for DoD and what kind of procurement vehicle was utilized. From his survey results, five out of the seven respondents indicated that further business with DoD was done after completion of the OTA. Only four out of the five participants provided an answer as to what procurement vehicle was utilized for follow-on business, as depicted in Figure 3 (Ibid, pp. 67-70).

However, his study does not differentiate the type of follow-on opportunities from DoD. It is difficult to discern: (1) transition from the OTA prototype directly to production, (2) if the OTA "opened doors" to provide additional work in the form of OTAs or standard procurement contracts, or (3) if additional work was the result of a successful bid and award for continued projects. The correlation between the original OTA and follow-on work was not clearly established.

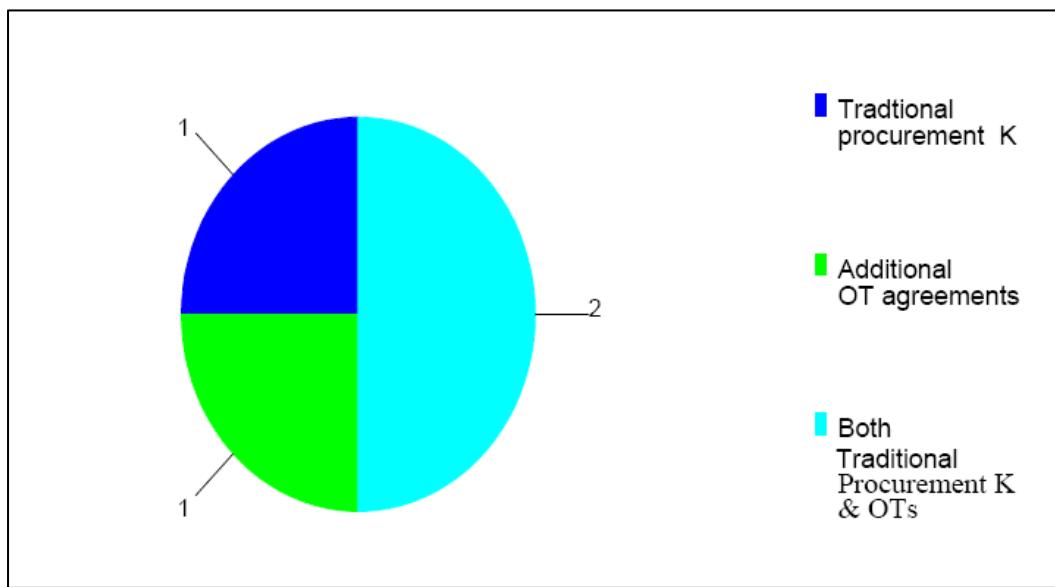


Figure 3. Type Of Vehicle Used To Form Follow-On Relationships With DoD (From: Gilliland, 2001, p. 69)

Stamatopoulos (1999) develops a core of four measures as a standard of metrics to apply in monitoring the performances of OTAs. His research methodology was derived primarily by surveying 15 different DoD buying activities for their contract management metrics and then applying Training Resources and Data Exchange's metric to analyze the results (pp. 50-51, 135). However, with the survey to the different buying commands being quite broad, there is no mention as to whether the respective organizations had any experience with conducting an OTA agreement. There was also no consideration given to how OTA agreements are structured, since each arrangement could be executed with one firm, one firm with sub-tier partners, multiple firms under a consortium, competed by different firms in multiple phases, and so forth. This may be attributed to the uniqueness of each OTA agreement as having to meet the satisfaction of the participants involved (Smith, et al., 2002, p. 12).

Slade (1998) examines the efficacy of the Commercial Operations and Support Savings Initiative (COSSI) in attracting non-traditional contractors for the purpose of taking existing commercial products and processes, and modifying them into existing weapons systems to provide substantial O&S costs for the military. The COSSI program utilizes OTA as a procurement method to establish these agreements. He selected 30 COSSI agreements from 81 proposals initiated in 1997 to conduct interviews with DoD and industry officials associated with these agreements. His results reveal the following: 63 percent of the samples were traditional contractors;¹ and 80 percent believed OTA was not a factor in conducting business with DoD, but identified more closely to the business opportunity COSSI provided (pp. 21, 52). His paper also highlights the importance of OTAs in providing opportunities for DoD work with non-traditional firms:

Several of the small, non-traditional contractors stated that the use of a Section 845 Agreement was a critical factor in their decision to respond to the solicitation. They contended that if a traditional method had been used, they could not have obtained the required, Government-approved systems in the time allocated (p. 56).

¹ For this study, “Traditional Contractors are defined as those whose business processes are predominantly oriented towards doing business with the Government” whereas “Non-traditional Contractors are those business processes oriented towards doing business with the commercial sector.” (Slade, 1998, p. 92)

Hayes (1998) developed a prescriptive business model to assist the decision maker in determining if an OTA is the appropriate procurement method, as shown in Figure 4. The information supporting this model is derived from the interviews with 43 acquisition professionals (pp. 53-54, 92-93).

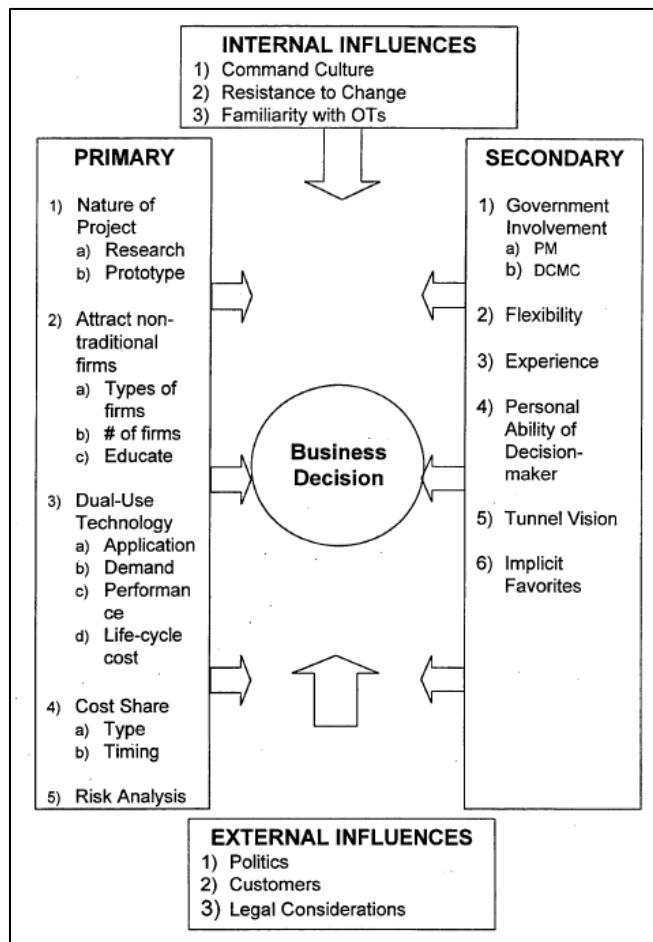


Figure 4. Hayes OT Decision Model (From: Hayes, 1998, p. 94)

Kuyath (1995) attempts to promote awareness to DoD of OTAs, with the potential for reducing R&D costs and reducing barriers to high-technology commercial companies' participating with DoD in developing dual-use technologies (p. 522). He presents an in-depth description of the origin and the authority for DoD to enter into OTAs, and then provides a detailed structure of the DARPA and Air Force OTA agreement models followed with a comparative analysis between the two organizations' agreement types (pp. 525-530, 542-570). To stimulate greater use for the benefit of DoD and private

industry, he recommends: (1) Giving both TIA and OTA authority over all Government agencies to initiate research projects and conduct prototyping; (2) Conditioning a requirement of 50 percent cost-sharing aspect to account for market-risk as well as IR&D costs incurred by the company prior to OTA; and (3) Revising legislation to state that OTs are not subject to the Bayh-Dole Act so that a firm's IP rights are adequately protected in OT agreements via revised legislation (p. 575).

C. STRATEGIC ANALYSIS OF THE MACRO ENVIRONMENT

1. Porter's Five-Forces Model Analysis

Porter's Five-Forces Model is used to analyze the defense industry to show how major defense firms maintain a large degree of competitive advantage in the research, development, and production of weapons and weapon systems. This analysis examines each aspect independently, starting with Rivalry from Competing Sellers, Supplier Power, Threat of Substitutes, Threat of New Entrants, and Threat of Buyers (Porter, 1980).

a. Rivalry from Competing Sellers

This industry is dominated by five top-tier firms: Lockheed Martin, Boeing, BAE Systems, Northrop Grumman, and Raytheon. Compared with other firms in the industry, these five lead in most categories including company size, amount of defense contract dollars awarded, and the high level of capability ranges the company maintains. Table 2 displays these firms by respective rankings in terms of total revenue earned for 2007. One should note that a large number of smaller firms operate beneath the five top-tier defense contractors to support the various needs of DoD and its complex weapons systems requirements.²

² For the purposes of this paper, the defense industry is characterized by a three-tier structure based on company size, amount of defense contract dollars awarded, and the level of capabilities range the company maintains. The major defense contractors (Tier 1) followed by medium-sized firms (Tier 2) and then small contractors (Tier 3).

Table 2. Top Five Defense Firms by Total Defense Revenue Earned in 2007
 (From: Defense News Top 100 Defense Company Rankings, 2007)

Rank	Company	2007 Defense Revenue*	2006 Defense Revenue*	2007 Total Revenue*	% of Revenue from Defense
1	Lockheed Martin	\$36,090.00	34,225.00	\$39,620.00	91%
2	Boeing	30,800.00	29,200.00	61,530.00	50
3	BAE Systems	25,070.60	20,935.20	26,967.60	93
4	Northrop Grumman	23,649.00	23,332.00	30,148.00	78.4
5	Raytheon	19,500.00	18,200.00	20,291.00	96.1

*In millions of U.S. dollars, at the end of each firm's fiscal year

The dominance of Tier 1 firms is evident in the contract amounts awarded. Table 3 shows the top five defense contractors ranked on the basis of aggregate contract award dollars for 2005 and 2006. The data were compiled by the DoD Statistical Information Analysis Division based on procurement actions (i.e., definitive contracts, obligated portions of letter contracts, job orders, task orders, delivery orders, and any other orders against existing contracts) reported on Individual Contracting Action Reports with adjustments from modifications (Statistical Information Analysis Division Website, 2007). The top five firms were awarded over \$84 billion collectively, representing approximately 26 percent of total Federal procurement spending (Ibid., 2007).

Table 3. Top 100 Companies Receiving The Largest Dollar Volume Of Prime Contract Awards – FY2005 & FY2006 (From: Statistical Information Analysis Division Website, 2007)

Company Name	Awards (Billion\$)		Rank	
	2006	2005	2006	2005
LOCKHEED MARTIN CORPORATION	26.6	19.4	1	1
BOEING COMPANY	20.3	18.3	2	2
NORTHROP GRUMMAN CORPORATION	16.6	13.5	3	3
GENERAL DYNAMICS CORPORATION	10.5	10.6	4	4
RAYTHEON COMPANY	10.1	9.1	5	5

The barriers for exit for these large, traditional contractors are very high, given the investment in expensive equipment, machinery, and facilities and highly specialized workforce required in producing and delivering various weapons and weapons systems. PESTEL analysis further explores some key driving factors that have contributed to the dominance of these five traditional contractors.

b. Supplier Power

Differentiation of inputs in this industry is high, given the complexity of weapons systems produced today. Switching costs of firms exist depending on certain commodity types; but, given the cost-type contracts in DoD procurement, the costs associated with inputs in material, labor, and operating are reimbursed by the Government. Cost-reimbursement contracts alone represent over 40 percent of Federal contracts utilized in 2005 (Defense contracting improved insight and controls needed over DoD's time-and-materials contracts, 2007, p. 12). Appendix A shows a breakdown of the different contract types used in DoD for FY1996-2005.

Of concern is the accessibility of strategic materials (e.g., steel, aluminum, composites, super alloys, etc.) necessary for DoD purposes. A 2007 Industry Report on Strategic Materials by The Industrial College of the Armed Forces highlights some challenges that are relevant to the defense industry: (1) Receding National Defense Stockpile amounts since 1992; (2) Availability issues stemming from global competition, namely high demands from China and India; and (3) Protectionist policies such as the Buy American Act and Berry Amendment restrict defense firms from purchasing material from outside the United States (2007, pp. 10-11).

The supply chain of the industry also entails the prime contractor relationship of large firms subcontracting to take advantage of smaller firms for their specialties and capabilities. The smaller firms depend on top firms for their ability to win large defense contracts and expertise in managing them. For example, the challenges and costs in complying with contracting guidelines in the *FAR* create difficulties for small firms to conduct business with the Government. In fact, top-tier firms have assumed the

role of “Lead System Integrator” to facilitate the integration of different technologies from various subcontractors for a particular weapons program. This practice first started in “March 2002 when the U.S. Army and DARPA selected the team of Boeing Co., Chicago, and Science Applications International Corp. (SAIC), San Diego, to become the lead systems integrator (LSI) for the service’s multibillion-dollar Future Combat Systems program” (Ratnam, 2007).

c. Threat of Substitutes

Threats of substitutes are non-existent for traditional contractors in providing weapons in the U.S. There exists global competition from foreign defense firms, but these companies are precluded as authorized sources of procurement by DoD from legislative measures. The Buy American Act (41 USC 10a-10d) prevents agencies within DoD from purchasing foreign weapons with few exceptions as noted in the FAR.³ But, joint ventures between U.S. and foreign contractors have been allowed to leverage capabilities for co-development (e.g., Joint Strike Fighter) and access to new markets (e.g., French company EADS’ bid on KC-135 Air Force Tanker replacement). These are known as “offsets” that are “commercial or industrial benefits that a company offers a foreign government as an inducement or condition for the purchase of military goods or services” (Defense trade contractors engage in varied international alliances, 2000, p. 4).

d. Threat of New Entrants

New entrant threat persists in the defense industry because innovative firms can provide unique solutions that larger and more traditional firms are unable to offer. But, dominant firms are able to leverage their strength in size, resources, capabilities, and even relationships to ensure contract awards for the largest defense contracts. Top-tier firms can effectively use lower tier sized companies with specialties for subcontracting purposes. In turn, these firms must compete between themselves for

³ FAR provides the following exceptions to the Buy American Act: (1) Impracticable or inconsistent with public interest, (2) Nonavailability, and (3) Unreasonable cost. Subpart 25.202 provides these exceptions in greater detail.

these subcontracts. Large firms can also acquire these firms through mergers and acquisitions for their attractive capabilities, while minimizing competition.

Industry consolidation has reduced the number of major defense contractors. According to Pierre Chao, Senior Fellow and Director at the Defense-Industrial Initiatives, “Wall Street wanted more. Electronics were growing in importance in the (defense) industry...So the boardrooms pushed a new round of integration, this time vertical, picking up IT and electronics suppliers...By the end of the 1990s, 107 firms had become five” (Chao, 2005). Figure 5 shows an industry consolidation of major defense companies from 1990 to 2000.

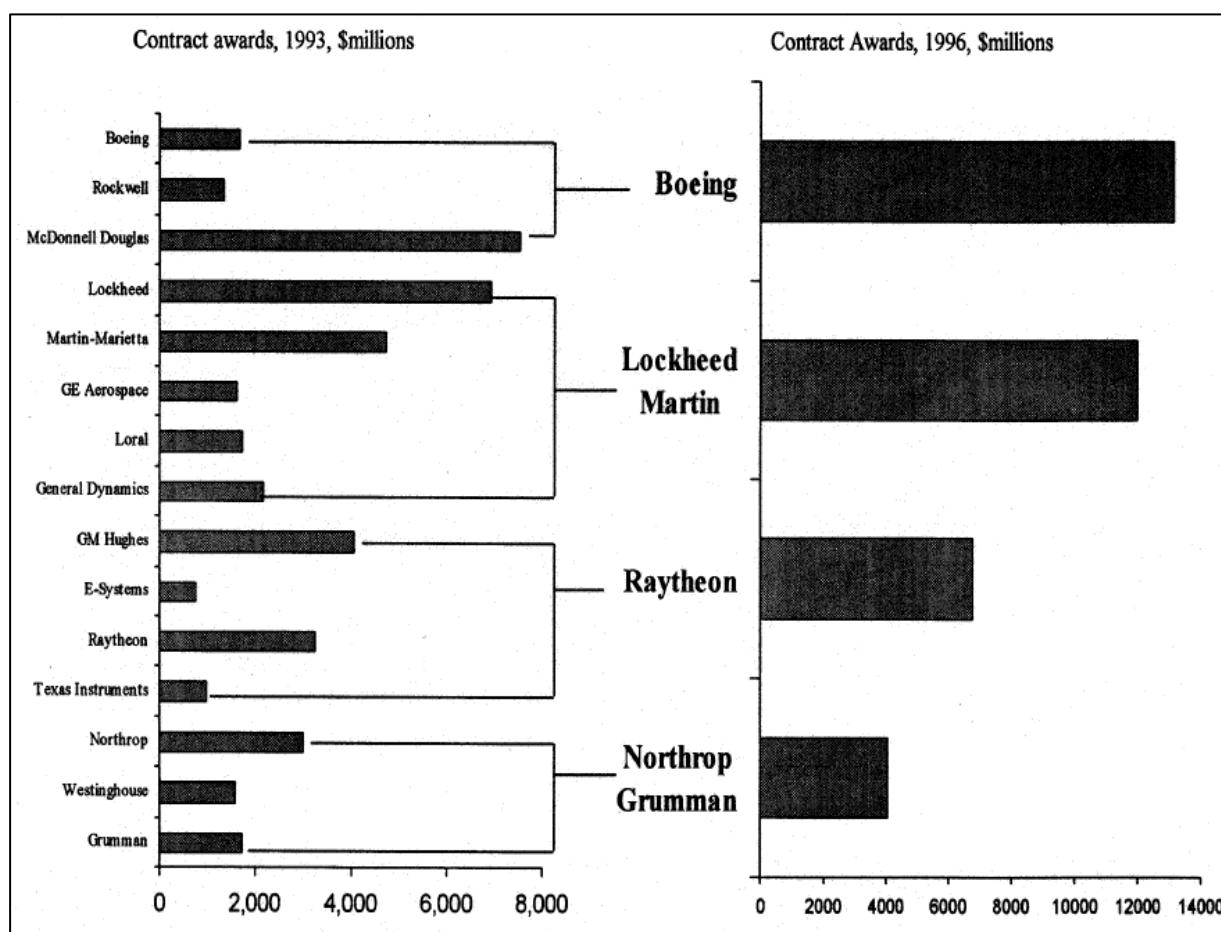


Figure 5. Snapshot of U.S. Defense Industry Consolidation, 1990-2000 (From: Markusen, 2000, p. 32)

e. Threat of Buyers

The “buyers” are primarily the respective services in DoD. But, there is influence from multiple stakeholders that include the President, Secretary of Defense, and Congress, who holds the power of the “purse.” To procure large-scale weapons and their lifecycle support, the “buyers” essentially must procure from the Tier 1 contractors who hold the capabilities to research, develop, produce, and sustain.

2. PESTEL Analysis

PESTEL Analysis examines the general environment surrounding the defense industry in a macro perspective. Its focus is on six main areas: Political, Economic, Sociocultural, Technological, Ecological, and Legal issues (Ventresca, 2007). The Ecological issues were disregarded in this analysis since DoD mandates compliance to Federal environmental laws, with not much significance attributed to ecological issues in the defense industry.

a. Political

The defense industry is affected by changes in the political environment as it may impact funding and legislative support for defense-related issues. Therefore, the defense industry dedicates a large amount of resources to ensure its agenda is supported by the Government and in the public. The “Iron Triangle” helps to illustrate how the defense industry effectively maintains a strong political agenda through interest groups or non-governmental organizations (NGOs) and influences DoD and Congress (Calhoun, 1992, p. 2). As suggested in Figure 6, these groups may lobby, educate, and pressure to affect public policy on behalf of the defense industry they represent. Interest groups include trade associations and lobbying groups whose approach and tactics vary.

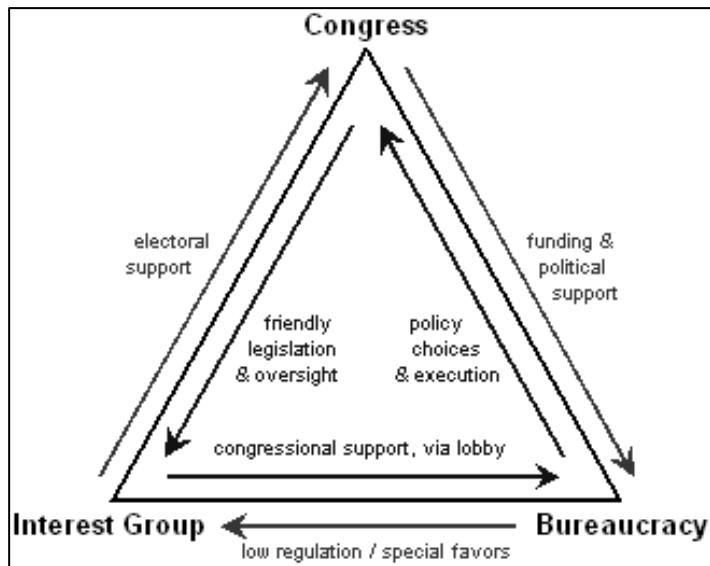


Figure 6. The “Iron Triangle” (From:
<http://www.thebestlinks.com/images/5/5b/Irontriangle.PNG>)

Defense trade organizations leverage information and provide Government interaction to gain support from members that include defense firms as well as individuals in the private and public sectors. According to Dombrowski and Gholz (2006), the defense industry “maintain large and active lobbying organizations including the American Shipbuilding Association to remind the public of their views of the benefits of preserving existing firms (and their facilities)” (p. 141). For example, the Aerospace Industries Association of America publicizes their 2008 agenda: “Keeping America Strong: Advance U.S. Global Leadership in Aerospace and Defense,” whereas the National Defense Industrial Association vision is “America’s Leading Defense Industry Association Promoting National Security” (Aerospace Industries Association Website, 2007; National Defense Industrial Website, 2007).

Lobbying groups place emphasis on funding and relationships to ensure political support of defense programs. Defense firms employ multiple lobbying groups to represent their interests. For example, the top-ten major defense contractors spent over \$324 million in campaign contributions from 1998 to 2004 (Makison, 2004).

Defense firms also operate outside the triangle with campaign contributions to both party committees and candidates. From 1998 to 2003, “the top 737

defense contractors gave \$61.6 million in campaign contributions to Republican Party committees and \$26.4 million to Democratic Party committees,” followed by contributions to individuals, but with the top recipients belonging to the House and Senate Defense Appropriations Subcommittees (Ibid., 2004).

The triangle may change according to the updated DoD policy regarding information sharing with NGOs. As noted in a recent FCW Media Group article, “The Defense Department’s new information-sharing strategy will require officials to anticipate their data being used by non-governmental organizations, coalition partners, other Federal agencies, and state and local governments” (Miller, 2007). The extent of this new policy may enhance the relationships between DoD and NGOs, thereby improving the defense industry’s political influence.

b. Economic & Sociocultural

The long-term U.S. budgetary outlook is a concern to the defense industry as well as to Government officials and private citizens. This is despite the most recent defense budget request for FY08, asking for a base discretionary budget of \$481.4 billion along with a supplemental for supporting the war of \$141.7 billion (Jane’s Defense Website, 2007). The economic concern stems from the projected availability of Government funding (i.e., discretionary budget) for defense spending. The trend for discretionary funding has been steadily decreasing since the 1960s due to mandatory spending expenditures (e.g., Social Security, Medicare, etc.) caused by an aging population and shrinking workforce (See Appendix B). Projections such as the one shown in Figure 7 show how mandatory spending programs will slowly squeeze out existing dollars available for defense spending.

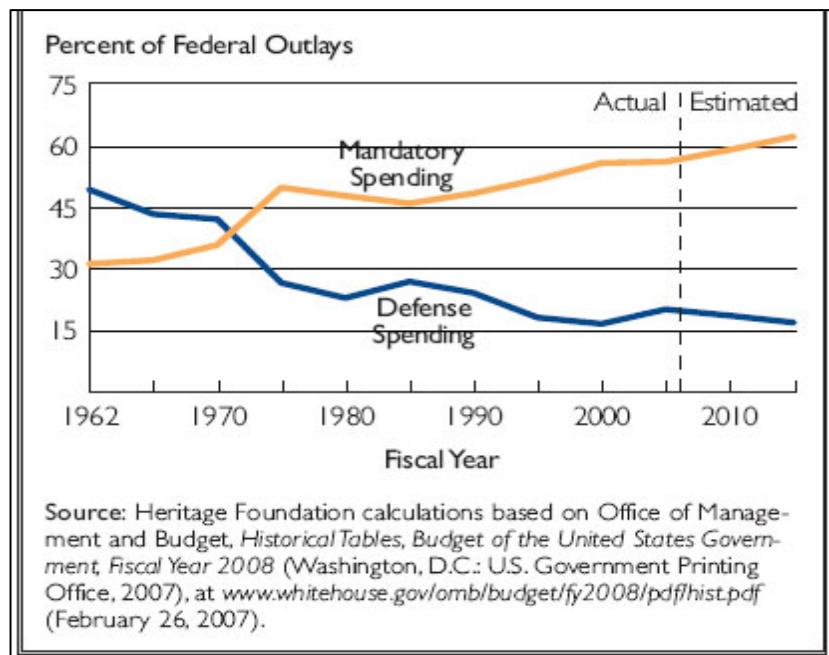


Figure 7. Mandatory Spending vs. Defense Spending, 1962-2015 (Projected) (From: <http://www.heritage.org/Research/Budget/bg2012.cfm>)

c. Technological

Since the end of the Cold War, U.S. technological innovations have shifted away from the defense-related initiatives to market-driven research due to drastic reductions in military spending. The military budgets in R&D decreased 26 percent in real terms from 1987 to 2000 (Markusen, 2000, p. 28). This is currently evident by the large number of major technological advancements being fielded in the commercial sector. A document published by the Council of Competitiveness states that, “Technology base funding by the DoD is reaching a 35-year low” where “manufacturing companies contribute nearly 75 percent of total industry R&D funding” (Council of Competitive Website, 2007).

d. Legislative

A number of laws and acquisition policies have helped shape the defense industry into what it is today. Most notable is the Commercial Item Authority passed by Congress in 1994 to acquire commercial items readily available from the market with

minimum oversight in the procurement process. The idea was driven by the goal of improving commercial item acquisition with emphasis on accessing technologies developed in the private sector. This is especially the case where “commercial sector leads innovation in telecommunications, software, and information systems, increasing the need for DoD to find means to access this technology” (Managing the supplier base in the 21st century, 2006, p. 4). The authority was expanded in the Fiscal Year 1996 Defense Authorization Act. This “simplified commercial item acquisition by authorizing, for a three-year period, commercial item buys up to \$5.5 million in contract value to be purchased using greatly simplified procedures” and sidesteps cost or pricing data requirements (1996 Annual Defense Report, 1996, Ch. 14). Figure 8 provides an overview of commercial acquisition legislative history.

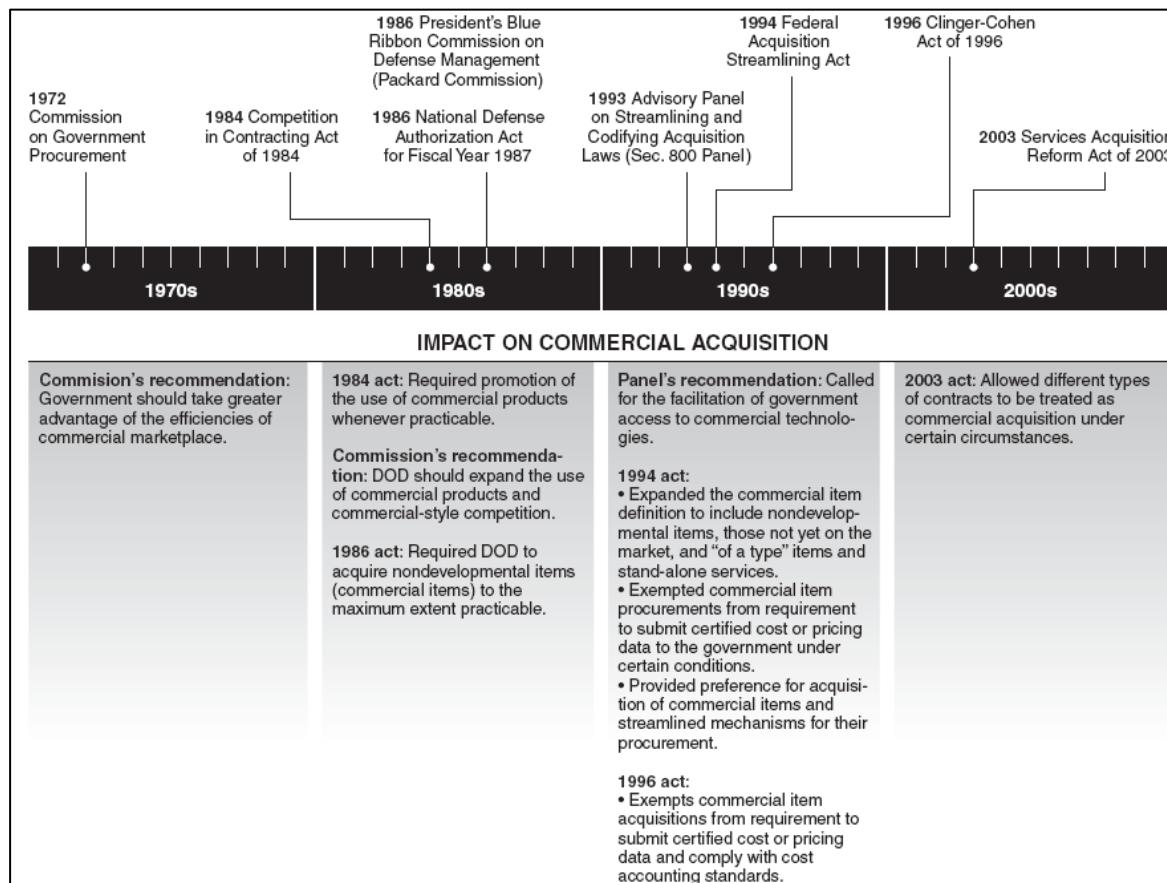


Figure 8. Overview of Commercial Acquisition Legislative History (From: DoD contracting efforts needed to address Air Force commercial acquisition risk, 2006, p. 5)

Although intended to spur commercial acquisition, improper classification of commercial acquisitions has resulted with many instances of large awards going to traditional contractors inappropriately designated as commercial. Most notable are the Inspector General findings on Air Force acquisitions for the C-130J cargo aircraft, the KC-767A tanker aircraft, and F-16 simulator services where commercial procurement was applied (DoD contracting efforts needed to address Air Force commercial acquisition risk, 2006, p. 14).

The Bush administration has advocated the approach of commercial acquisition to include purchasing beyond existing commercial requirements. A June 2006 report published by the U.S. House of Representatives Committee on Government Reform states: “Bush Administration has interpreted the ‘commercial item’ exemption to cover a multitude of items that are not subject to open market forces. In 2003, the White House Office of Federal Procurement Policy issued a memorandum advocating, in bold print, “that Federal agencies use the commercial item authority to buy noncommercial items” (Dollars not sense, 2006, p. 17).

Acquisition policy has also been realigned to ensure the defense industrial base will be sustained for the remaining traditional defense contractors. Examples include: (1) “Dual Lead Ship Strategy” mandated by the Under Secretary of Defense for Acquisition, Technology & Logistics for the procurement of DDG-1000 and the Littoral Combat Ship programs to ensure the two remaining defense shipbuilding firms were provided the opportunity to develop and produce a respective prototype of each ship; (2) “Leader Company Strategy” under *FAR* Subpart 17.401 where the contractor with the winning proposal must share design and other critical proprietary information to the losing proposal contractor in order to have a portion of the contract work; and (3) “Winner Take All” competition format for the \$200 billion Joint Strike Fighter program between Lockheed-Martin and Boeing where both contractors were given the opportunity to design, develop, and produce a prototype for demonstration, which would lead to the follow-on contract award (Garamone, 2001). If all else fails, the Defense Procurement Act provides a variety of safeguards to maintain the defense industrial base for national security reasons. In particular, Title III authorizes the President to “provide appropriate

incentives to develop, maintain, modernize, and expand the productive capacities of domestic sources for critical components, critical technology items, and industrial resources essential for the execution of the national security strategy of the United States” (50 USC App. §2061). These incentives may entail loans, loan guarantees, purchase commitments, production equipment leases, and so forth.

Even though small defense contractors are limited by size, they have been afforded incentives from legislation and the *FAR* to provide financing options and dedicated procurement dollars through set-aside programs. Medium-sized firms, on the other hand, have no legislation or policies that provide them protection or special treatment. As a result, medium-sized firms (i.e., Tier II defense contractors) are experiencing a decline in their share of defense contract dollars. A 2007 *Washington Post* article reported, “In 1995, mid-tier services companies received 44 percent of Government contracts, while large firms took 37 percent of the market...By 2005, mid-tier companies took 33 percent of the market while large firms shared in 46 percent” (Goldfarb, 2007).

From the Five-forces and PESTLE analyses, the major defense contractors have the most advantages doing businesses with the DoD, whereas the small- and medium-sized firms are not able to compete at the same level. These defense firms have established a firm foothold to conduct business with the Government and military that is reinforced with their ability to influence via the “Iron Triangle” and policies that favor protecting the defense industrial base. Therefore, it is even more critical for the DoD to access innovative technologies from a greater number of non-traditional competitors.

D. HISTORICAL LEGISLATION

1. Relevant Legislation

Over time, the OTA authority to prototype has been modified on different occasions by three legislative amendment types. These amendments have sought to:

- Expand the authority to other organizations (note: OTA authority has also been granted to Government organizations outside DoD; this will be covered in a following section);

- Create greater oversight and additional reporting requirements; and
- Provide transition opportunities to non-traditional firms to go into production following a successful OTA prototype.

Yet, one aspect that has remained constant is its temporary authority status. OTA authority has been extended five times since its initial enactment in 1993, with the most recent being the National Defense Authorization Act (NDAA) for FY08. Section 816 granted a five-year extension through September 30, 2013 (H. R. Rep. No. 110-146, 2007). The following provides an OTA legislative history highlighting significant changes over the years.

Before OTA legislation was created, the Packard Commission initiated the authority by recommending that DARPA spearhead prototyping efforts according to the President's Blue Ribbon Commission on Defense Management (1986). The report emphasized the significance of building prototypes for all major weapon systems to incorporate new technologies that can provide dependable information to mitigate development risk. This report states:

In general, prototyping and testing in the early stage of R&D should be done by the Service that would be the primary user of the resulting system. In order to promote the use of prototyping, however, we recommend expanding the role of DARPA.

At present, DARPA conducts research and exploratory development in high-risk, high-payoff technologies. DARPA should have the additional mission of stimulating a greater emphasis on prototyping in defense systems. It should do this by actually conducting prototype projects that embody technology that might be incorporated in joint programs, or in selected Service programs. On request, it also should assist the Services in their own prototyping programs. The common objective of all of these prototyping programs should be to determine to what extent a given new technology can improve military capability, and to provide a basis for making realistic cost estimates prior to a decision on full-scale development. In short, the prototype program should allow us to fly-and know how much it will cost-before we buy. (pp. 20)

This recommendation by the Packard Commission for DARPA to assume the prototyping initiative was an ideal fit, given the organization's past successes and unique mission orientation. As noted here:

DARPA's primary mission is to foster advanced technologies and systems that create "revolutionary" advantages for the US military. Consistent with this mission, DARPA is independent from the Military Services and pursues generally higher-risk, higher-payoff research and development (R&D) projects. DARPA program managers are encouraged to challenge existing approaches to warfighting and to seek results rather than just explore ideas. Hence, in addition to supporting technology and component development, on occasion DARPA funds the integration of large-scale "systems of systems" in order to demonstrate "disruptive capabilities." Disruptive capabilities are more than just new technologies; they are transformations in operations and strategy enabled by synergistic combinations of technologies. (Van Atta et al., 2003, p. S-1)

As a result, DARPA revised its charter to incorporate, "a greater emphasis on prototyping in defense systems by conducting prototype projects... and, on request, assist the Military Departments in their own prototyping programs per DoD Directive 5105.41 dated January 25, 1989" (Memorandum of Law, 1996, p. 2).

In 1993, Congress officially authorized exclusive and broad authority to DARPA to enter into agreements (OTAs) to prototype technologies and weapons systems relevant to DoD acquisition and development. The authority was granted under Section 845 of the NDAA FY1994 under Title 10 USC 2371. OTAs were given a temporary pilot status to be conducted for a period of three years. The authority allowed for an innovative approach to be used for DoD projects to acquire technology and innovation where a traditional *FAR*-based procurement method would not be sufficient.

"Other Transactions" are not subject to the Armed Services Procurement Act, *FAR*, *DFARS*, or other laws and regulations specific to the procurement system, including the statutes codified in title 41, U.S. Code. Likewise, laws and regulations governing assistance relationships or specific to grants and cooperative agreements are not applicable. Statutes of general applicability, such as title VI of the Civil Rights Act of 1964, are applicable. (Dunn, 1996, p. 35)

The authority also emphasized competition to the maximum extent practicable.

With the success of rapid prototyping experienced by DARPA (See Figure 9), the authority was then amended to extend the program for another three years and expand usage to military services per Section 804 of NDAA FY97:

Authority.-The Director of DARPA, Secretary of a military department, or any other official designated by the Secretary of Defense may, under the authority of section 2371 or title 10, United States Code, carry out prototype projects that are directly relevant to weapons or weapons systems proposed to be acquired or developed by the Department of Defense.

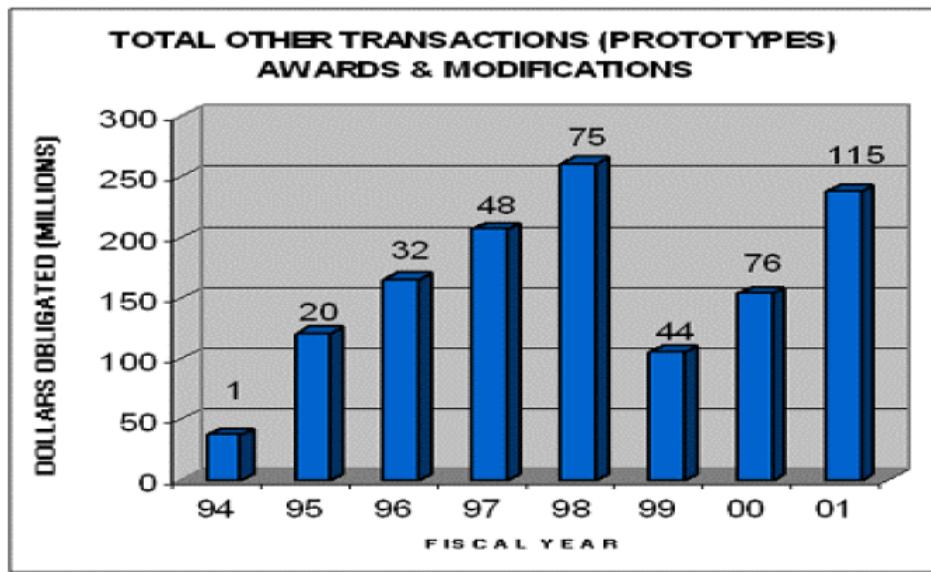


Figure 9. Total number of OTAs awarded and dollars obligated by DARPA, 1994 – 2001 (From: DARPA Contract Management Office web page, 2001; in Gilliland, 2001, p. 27)

In January 1997, the Under Secretary of Defense for Acquisition and Technology, Paul Kaminski, introduced the Commercial Operations and Support Savings Initiative (COSSI) as means for DoD to reduce O&S costs by taking innovations developed in the commercial sector and inserting them into existing weapon systems, thereby reducing DoD R&D costs (See Figure 10) (The Commercial Operations and Support Savings Initiative, 2001, p. 1). OTAs were chosen as the preferred business instrument for COSSI programs under Section 804 (Public Law 104-208) to reduce the restrictiveness associated with *FAR*-based contracts that would otherwise preclude commercial firms

from participating (Report to Congress on the activities of the DoD Office of Technology Transition, 2000, p. 35). This allowed DoD to tailor agreements with greater flexibility toward the treatment of IP and reduced requirements of cost principles to be able to access R&D developed by private companies. An OTA agreement also allowed for creative incentives with funding at different phases and on the basis of payable milestones where “observable technical events that the contractor and government agree in advance will be the basis for incremental payments” (Peters, 1997, p. 48).

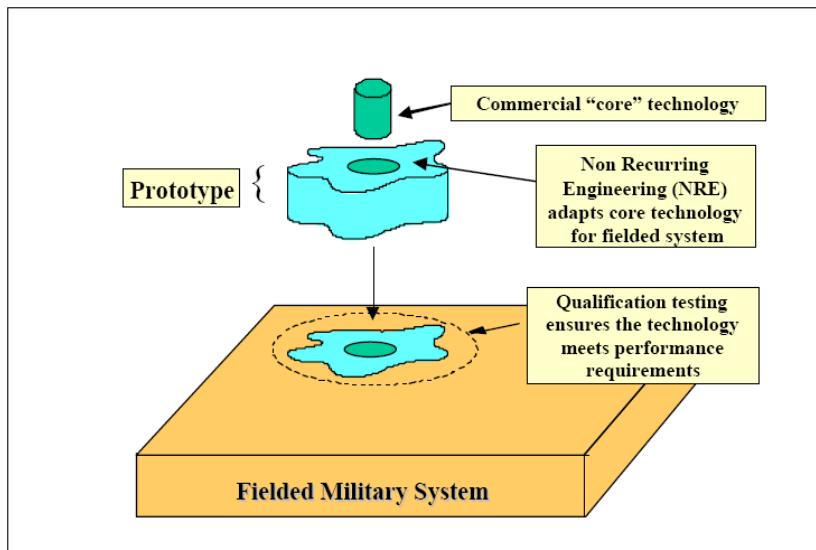


Figure 10. The COSSI Concept (From: The Commercial Operations and Support Savings Initiative, 2001, p. 2)

Starting in 1999, the OTA authority evolved as Congress implemented greater controls and follow-on production for completed prototypes. Section 801 (Public Law 106-65) amended Section 845 to include (1) Comptroller General (CG) review for an OTA that exceeded total payments of \$5 M in which the CG can examine the records of the parties involved; (2) the Head of Contracting Activity (HCA) may waive this review requirement if it is not in the public interest by notifying Congress; and (3) the CG review is limited to no more than three years after final payment is made. This legislative change came after an Inspector General Audit Report (1999) calling for greater OT guidance with emphasis on the reporting of independent research and development (IR&D) costs. The Inspector General asserted the \$60.2 M in IR&D costs (i.e., 72

percent of discrepant costs identified) should not be treated as a share of a company's in accordance with Director, Defense Research & Engineering (DDR&E) nonmandatory guidance (pp. i-ii, 12).

For NDAA FY2001, Section 803 (Public Law 106-398) was enacted adding further requirement that (1) at least a non-traditional defense contractor participates in a significant extent on an OTA, or (2) must contribute to a 1/3 cost-share requirement, or (3) receives a special procurement exception determination justifying the use of an OTA. It also defined a “non-traditional defense contractor” as:

An entity that has not, for a period of at least one year prior to the date that a transaction (other than a contract, grant, or cooperative agreement) for a prototype project under the authority of this section is entered into or performed with respect to--

- (1) any contract that is subject to full coverage under the cost accounting standards prescribed pursuant to section 26 of the Office of Federal Procurement Policy Act (41 USC 422) and the regulations implementing such section; or
- (2) any other contract in excess of \$500,000 to carry out prototype projects or to perform basic, applied, or advanced research projects for a Federal agency, that is subject to the Federal Acquisition Regulation. (Public Law 106-398, Section 803)

In December 2001, Congress supported amending the OTA prototyping authority by passing Section 822 (Public Law 107-107), which would provide firms the ability to transition into a production contract following successful prototyping efforts from an OTA arrangement by exempting competition requirements. This was in response to DoD and industry who “have repeatedly requested that we [Congress] extend OTA to production contracts” ever since the authority was first established (Army Transformation and Future Combat System, 2005, Body section, para. 10). However, the new legislation required that certain conditions to be met: (1) competitive procedures were used in the selection process of the OTA; (2) prototyping project was completed; and (3) a predetermined number of units, along with pre-specified target price in the follow-on

production, adhered to the terms and conditions of the original OTA. A concern regarding this new language was incorporated into a 2004 Code of Federal Regulations as proposed by DoD, which states:

Limitation. As a matter of policy, establishing target prices for production units should only be considered when the risk of the prototype project permits realistic production pricing without placing undue risks on the awardee. (Transactions Other Than Contracts, Grants, or Cooperative Agreements, 2004, pp. 20-21)

As a result, DoD and the contractor must accurately project and come to terms with a number of issues regarding the production of a successfully completed prototype to adequately predict quantity and price in the OTA agreement. These issues include, but are not limited to, predetermining an acceptable level of risk by all parties in the arrangement and projecting future funding requirements in order to be programmed for the procurement of goods. This would be difficult for agreement officers to ascertain, since standard contract requirements such as cost or pricing data are not mandated due to the nature of OTAs.

Two years later, Congress passed Section 847 (Public Law 108-136) authorizing the Secretary of Defense to create a five-year pilot program to extend transition opportunities for production to non-traditional contractors with a firm, fixed price type contract not to exceed \$50 million. This production item would be procured commercially per the Office of Federal Procurement Act, Section 4(12) (H.R. 1588, 2006). The pilot program was then incorporated as *DFARS* Subpart 212.70. However, the amended authority did not address or resolve the requirements for predetermined price and quantity established previously in Section 822.

Section 823 (Public Law 109-163) of NDAA FY06 added greater oversight to OTAs by modifying the authority to require a determination in writing by the senior procurement executive for the agency if the DoD project cost exceeds \$20 million, or by the Under Secretary of Defense for Acquisition, Technology, and Logistics if projects costs exceed \$100 million with the requirement to notify Congress at least 30 days in advance prior to entering into the award.

This modification was in direct response to what Congress deemed an inappropriate use of the OTA authority in the multi-billion dollar Future Combat System (FCS) Acquisition between the Army and Boeing company. Provided below is Senator McCain's statement at a Senate subcommittee hearing that the FCS weapons program does not meet Congress' intent of OTAs:

...We've [Congress] taken the view that with hundreds of millions of dollars, or even billions of dollars, at stake, the taxpayer needs the protections built into the traditional procurement system. And I'd be glad to hear from the witnesses if they think there's something wrong with the traditional procurement system and if it needs to be modernized or updated.

While we recognize that there may be need for continuing doing business with non-traditional contractors in the production phase of a program, we prefer to address this issue through targeted waivers that are limited to those companies who need them. Now the Army has put forward a program that uses Other Transaction Authority for a \$20 billion contract—a figure much greater than the Congress intended, and unprecedented. (Army Transformation and Future Combat System, 2005, Body section, paras. 9-10)

2. Non DoD-Related Legislation

The authority to conduct “Other Transactions” has been granted to other Government departments and agencies. Table 4 shows these organizations with this authority, detailing the originating authority along with their purpose for the “Other Transaction” Authority. The purposes for utilizing “Other Transaction” can range from specific to very broad in order to achieve their respective goal or objectives. The DHS was also afforded the authority to conduct prototype development via OTAs similar to DARPA and the DoD Services.

Table 4. List of Government Organizations and Respective Authority to Conduct Certain “Other Transactions”

Government Organization	Authority to Enter into an “Other Transaction”	Purpose
NASA	NASA Space Act of 1958, Sections 203c and 205	In the conduct of its work
DoT	DoT and Related Agencies Appropriations Act, Section 308	In execution of the Technology Reinvestment Project authorized under the Defense Conversion, Reinvestment and Transition Assistance Act of 1992
Federal Aviation Administration	Federal Aviation Reauthorization Act 1996, Section 226	Agency Objectives to include construction
DoT	Transportation Equity Act for the Twenty-First Century enacted June 1998, Section 5506	R&D efforts for the development of the Advanced Vehicle Technologies Program. (Did not specify OTA type)
DHS	Homeland Security Act of 2002, Section 831	Prototype Development
Head of any executive agency may enter into an OTA (and TIA) with OMB approval	FY2004 NDAA, Section 1441	Prototype Development for the purpose to defend against or recover from nuclear, biological, chemical or radiological attack

E. ALTERNATIVE PROGRAMS IN ADDITION TO OTA

Other non-*FAR* based methods also exist for prototyping development available to the Federal Government. These options, as discussed below, similarly entail flexible treatment of IP aspects, which encourages non-traditional participation. Unlike OTA authority, which is an alternative procurement tool, these alternatives are Government-managed programs. The first two, the Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR), are dedicated small business set-asides. The third is a venture type model originally developed by the Central Intelligence Agency (CIA) that seeks innovative solutions for a specific agency, which may afford it in prototype development form. The following discussion provides general information on these three programs.

Created under the Small Business Innovation Development Act of 1982 (P.L. 97-219), the SBIR Program is directed at small business concerns through set-asides to encourage innovation and meet R&D needs for the Government (Office of Extramural Research Website, 2007, para. 1). STTR was established in 1992 by Congress and funds

cooperative R&D projects between a small business and research institution for the purpose of “transferring” research ideas to market (DoD SBIR/STTR Overview, 2008, para. 7). Under the DoD model, both programs are evaluated and funded in three phases for potential prototype development and commercial development (See Table 5).⁴

Table 5. SBIR/STTR 3-Phase Approach with Funding Amounts and Timelines
(From: DoD SBIR/STTR Overview, 2008)

	SBIR	STTR
✓ Phase I: Project feasibility	6 months up to \$100,000	12 months up to \$100,000
✓ Phase II: Project development to Prototype	2 years up to \$750,000	2 years up to \$750,000
✓ Phase III: Commercialization	Commercialize, with non-SBIR/non-STTR funds, the technology in military and/or private sector markets	

SBIRs and STTRs are both similar and dissimilar to OTAs in certain aspects. Unlike OTAs, SBIR/STTR apply only to firms that meet the “U.S. for-profit small business of 500 or fewer employees” criteria, thereby excluding medium- and large-sized firms such as commercial industry leaders (Ibid., paras 4, 8). There are also funding caps on each project to not exceed \$850,000, whereas approval levels are required for OTAs in excess of \$20 million and \$100 million per NDAA FY06 legislation. However, these programs are similar to the OTA multi-phase approach where they are competed initially (submission prior to Phase I) and during the phases (winners are screened and selected in Phase I for project feasibility and then again at Phase II for project development for prototype).

⁴ There are currently 11 government organizations that must participate in the SBIR program: Department of Agriculture, DoC, DoD, Department of Education, Department of Energy, Department of Health and Human Services, DHS, DoT, Environmental Protection Agency, NASA, National Science Foundation. The STTR program has six participating agencies: DoD, Department of Energy, Department of Health and Human Services, NASA, and National Science Foundation. (SBA SBIR/STTR Program Description, 2001, paras. 5, 16). The way SBIR and STTRs are managed and executed may vary between the agencies. (SBA SBIR/STTR PowerPoint Overview, 2001, slide 15) DoD projects appear to focus on prototyping efforts.

Some individuals have expressed concern regarding the use of the SBIR program. In a testimony by Phyllis Gardner (2003) on behalf of the Biotechnology Industry Organization to the House Committee on Energy and Commerce, she contends there is a problem qualifying for SBIR where a firm must be at least 51 percent owned by “individuals” (to mean only natural persons) who are U.S. citizens. Start-up firms who receive most of their funding from venture capitalists may not be eligible for SBIR funding, and this is the case for most start-up biotechnology companies (Moving Research from the Bench to the Bedside, p. 4). Another issue is the strict Small Business Administration requirement of 500 employees necessary to qualify for SBIR during the time of award. This would disqualify many firms that fluctuate around that number of employment who can provide innovative R&D to the Government. A contracting officer at a medium-sized firm shared in the frustration that since their company employment numbers would change at any time they could become ineligible for the funding, but knew their company could provide unique technological solutions to DoD.

Though used to discover specific technologies under the CIA’s In-Q-Tel Model, the “venture catalyst” model also provides the opportunity for prototyping outside the *FAR*. Established in July 1999, this model applies Federal funding in the form of a strategic investment (up to \$5 million per company) through a non-profit organization established by a governmental organization to discover specific technologies in the private sector and accelerate them to provide solutions to the CIA (Molzahn, 2003, pp. 47, 49-50).

The research and prototyping efforts vary by agency needs. The original model, In-Q-Tel, was created to provide critical information technology applications to the CIA (*Ibid.*, p. 48). For the Army, OnPoint Technologies was “the result of Section 8150 of Public Law 107-117, the National Defense Appropriations Act for fiscal year 2002 which, set aside funding for a Venture Capital Initiative” focused on Mobile Power and Energy Enabling Technologies (OnPoint Technologies History, para 1). In 2006, NASA was the third governmental organization to be granted the venture capital authority. Its Red Planet invests in start-up firms in order to promote innovation that will enable “returning astronauts to the moon by 2020 and potentially sending them to Mars”

(Kaufman, 2006, para 8). Note that according to its website, the Red Planet program has been renamed Astrolab Ventures, to now include investments in Europe (Astrolab Ventures: The Fund, para 1).

The “venture catalyst” approach is quite unique and different from the standard acquisition process. According to Yannuzzi (2000), the In-Q-Tel Model is fashioned after OTs to meet the CIA’s unique criteria:

Before the partnership between In-Q-Tel and the Agency became a reality, the Agency had to develop a new contract vehicle that granted the Corporation the degrees of freedom it needed to operate in the market place. Most Agency contracts, including those in R&D, are based on the Federal Acquisition Regulations (*FAR*). However, the *FAR* is often viewed by industry as overly burdensome and inflexible. And, it has been the Department of Defense’s (DoD) experience that smaller companies often will not contract with the government because of the extra costs they would incur to be *FAR*-compliant. Because the Agency wanted to encourage such companies to work with In-Q-Tel, it took a different approach and designed a non-*FAR* agreement with the Corporation. It adopted elements from a DARPA model based on OT authority granted to the DoD by Congress. OT agreements permit authorized government agencies to design R&D agreements outside the *FAR* (ch. 6).

In addition, the model allows all sorts of business arrangements commonly found in commercial industry to facilitate creating the relationships with small companies who can provide the R&D solutions. They include joint ventures, sponsor competitions, sole source contracts, etc. (Yannuzzi, ch. 2). Lastly, there is no agency approval for any of the business arrangements under In-Q-Tel (*Ibid.*, ch. 2).

The operational model is depicted in Figure 11, which shows the general process of defining the need, searching for an industry solution, investing in technologies, and testing the technologies to determine additional funding for prototyping or pilot program for potential commercial development. Throughout this process, In-Q-Tel advises the firm on potential commercialization of its products (*Ibid.*, p. 51).

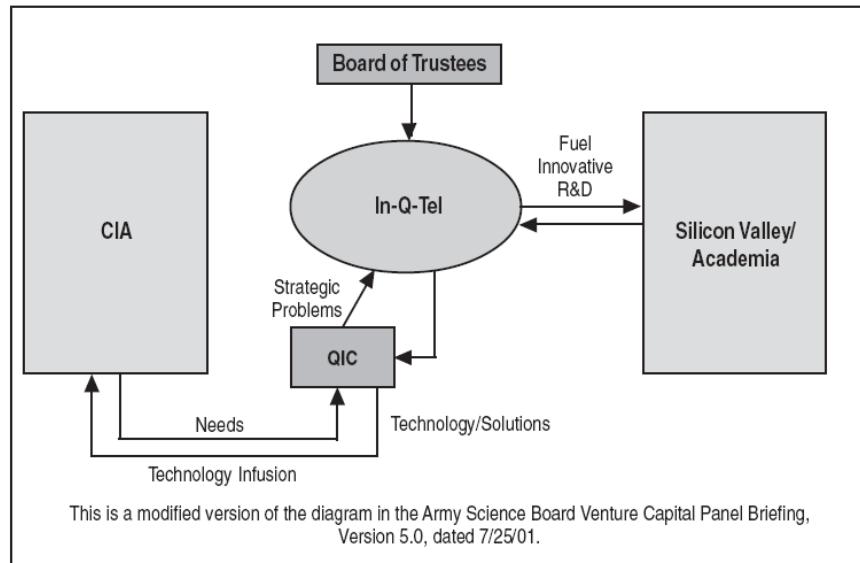


Figure 11. In-Q-Tel Model (From: Molzahn, 2003, p. 51)

For the “venture catalyst” model, the same limitation exists as with SBIRs and STTRs. These programs primarily address small start-ups that desire the capital and relationships for specific solutions to the respective organization providing the funding. The model excludes large and medium firms, including those who are leaders in industry with proven products and capabilities.

F. SUMMARY

This chapter reviews previous OTA studies, but finds that their approaches differ significantly from this research. The focus of previous studies deals primarily with determining if OTAs have met Congressional intent and on analysis of OTA benefits and limitations. Of some relevant interest is Gilliland’s thesis (2001) that asked if the relationships established by OTAs “opened the door” for follow-on business with DoD. But, Gilliland did not distinguish what follow-on work resulted from the OTA. Further, one cannot determine if the prototype resulted in additional work from DoD (e.g., additional contract or OTA), or led to direct production opportunities stemming from the specific completed OTA project.

Additionally, this chapter provides a macro analysis of the defense industry to demonstrate the advantages large defense contractors have enjoyed with industry

consolidation and the special relationships illustrated in the “iron triangle.” Legislative history on OTAs shows the authority and significant changes over time as amended by Congress, and emphasizes that the OTA authority has been extended outside DoD to other agencies. Finally, this chapter presents non-*FAR* based alternatives to prototyping in addition to the OTA authority.

The next chapter will examine the available opportunities in order for a completed prototype to transition for follow-on production.

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III. TRANSITION OPPORTUNITIES

A. INTRODUCTION

For “traditional” defense contractors, transitioning a completed prototype for follow-on production can be accomplished under *FAR* Part 15 (Contracting by Negotiation) since they are already accustomed, structured, and have the capacity to operate within existing *FAR* Part 15 protocols. However, “non-traditional” firms that are small or commercial in nature would find difficulty in complying with applicable standard procurement regulations. In doing so, non-traditional firms most likely would incur additional structure and cost requirements that would adversely affect profitability. For example, W.L. Gore & Associates (the advanced material developer and manufacturer of Gore-Tex) had conducted an internal survey to see how much it would cost to become CAS compliant because of certain materials innovations they believed could benefit both the DoD and DoE; however, they decided not to do business with the Government because it would be too costly (Anonymous, personal communication, March 27, 2008). The non-traditional firm could also transition the completed prototype with the assistance of another firm (e.g., traditional defense contractor), but this would result in having to potentially share sensitive, proprietary technical data that may compromise the competitive advantage of the non-traditional firm.

To bypass standard procurement requirements as well as alleviate intellectual property (IP) concerns, there are certain legislative provisions and regulations in the *FAR* and *DFARS* that provide opportunities for non-traditional firms and DoD to extend a prototype to additional follow-on work in production or services. This chapter looks at these different transitioning opportunities available to non-traditional firms. The Rosettex Technology & Ventures Group and CBRTA models apply an integrated and structured approach to OTA prototyping with opportunities to transition through the use of partnerships and strategic alliance that are also examined.

B. TRANSITION OPPORTUNITIES UNDER *FAR* & *DFARS*

1. *DFARS* Subpart 212.70-Pilot Program for Transition to Follow-On Contracting after Use of Other Transaction Authority

As was mentioned in the Legislative History section of Chapter II, Congress realized the importance of insufficient transitioning opportunities to non-traditional firms who had developed prototype weapons systems under an OTA. Congress enacted legislation in 2001 to provide follow-on production opportunities to non-traditional firms by exempting competition requirements that normally presumed in standard contracts, but with conditional requirements. These requirements are:

- Competitive procedures used in the OTA selection process,
- A completed prototype project, and
- A predetermined number of units with pre-specified target price for the production phase to be agreed to as part of terms and conditions of the original OTA agreement.

The rationale behind this legislation is that once the competition was completed with the awarding of an OTA, having the quantities and prices established up front would result in no further need to re-compete into transition for production phase. Therefore, full and open competition may exist at the beginning of the OTA process, but unnecessary in the production phase as *FAR* procurement statutes do not apply.

In 2003, Congress amended this legislation and authorized the Secretary of Defense to create a pilot program for non-traditional contractors to transition an OTA prototype into production under a fixed price type contract not to exceed \$50 million. DoD later incorporated this into regulation as *DFARS* Subpart 212.70, which allowed for greater flexibility toward the treatment of technical data rights on the basis of satisfying agency needs (*DFARS*, 2008).

2. *FAR* Part 12-Acquisition of Commercial Items

With the potential for certain OTA projects meeting dual-use purpose (both defense and commercial application), the developed prototype may achieve commercial

item criteria⁵ and can be procured under *FAR* Part 12.⁶ *FAR* Part 12 is ideal for non-traditional firms in transitioning a prototype for production because the CAS requirement is not applicable while technical data rights of the prototype are treated as commercial items provided to the public (*FAR*, 2008). However, market pricing must be available to establish “fair and reasonable” price.

The challenges of establishing market price for a completed OTA project is illustrated in the Evolved Expendable Launch Vehicle (EELV) Program that was intended for potential commercial service acquisition via *FAR* Part 12 (Mazur, 2003, p. 11). The EELV program goals were to develop a more affordable expendable launch capability by reducing recurring launch costs by 25 percent (Saxer, Knauf, Drake, & Portanova, 2002, p. 2). To help achieve this, a dual use approach was used to develop EELV for both the military and the projected commercial application resulting in an OTA award to facilitate a shared R&D effort (one-third of this cost was funded by the contractors) and a fixed price type contracts for commercial services delivery order contracts to two contractors (Ibid., 2002, pp. 6-7; Mazur, 2003, p. 11). The EELV program achieved successful launch demonstrations in “a little more than five years after award of the other transactions and well within the traditional seven-year space system development time line” (Mazur, 2003, p. 11). However, the commercial aspect was never realized due to the following:

Initial plans for the EELV program projected a much more robust commercial launch market. However, the decline in the commercial launch market since the late 1990s significantly reduced the anticipated number of Atlas V and Delta IV launches, making the government the primary customer for both launch vehicles. This reduction, in turn, caused anticipated prices for government launch services to increase significantly. (Defense acquisitions: Assessments of major weapon programs, 2004, p. 53)

⁵ *FAR* Part 2 defines a commercial item as “any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and— (i) Has been sold, leased, or licensed to the general public; or (ii) Has been offered for sale, lease, or license to the general public.” Additional criteria for commercial items can be found in *FAR* Subpart 2.1.

⁶ *FAR* Part 12 was established by Public Law 103-355 (FASA, 1994) to create special requirements for the acquisition of commercial items.

As a result, the Air Force had to revise the EELV acquisition strategy with cost-plus-award-fee contracts in 2006 (Defense acquisitions: Assessments of selected major weapon programs, 2008, p. 76).

3. FAR Subpart 13.5-Test Program for Certain Commercial Items

Subpart 13.5 authorizes the use of Simplified Acquisition Procedures (SAP) for supplies and services greater than the simplified acquisition threshold but not to exceed \$5.5 million with the same procedures in acquiring commercial items as required in *FAR* Part 12. Again, CAS is not applicable and the commercial aspect toward technical data rights is relevant. So, if a non-traditional firm can prototype with dual-use purpose and then be competed under SAP, then the follow-on production would not be subject to CAS requirements with reasonable protection of data rights to the firm.

4. FAR Subpart 37.2-Advisory and Assistance Services

The researchers identified a section of the *FAR* that may provide potential DoD follow-on business opportunities for non-traditional defense companies. This section is referred to as Advisory and Assistance Services (AAS) per *FAR* Subpart 37.2, which authorizes companies to provide professional advice or assistance services that may be relevant to the technical and engineering aspects of relevant or similar weapon system programs. AAS is defined in the *FAR* as:

Those services provided under contract by nongovernmental sources to support or improve: organizational policy development; decision-making; management and administration; program and/or project management and administration; or R&D activities. It can also mean the furnishing of professional advice or assistance rendered to improve the effectiveness of Federal management processes or procedures (including those of an engineering and technical nature). In rendering the foregoing services, outputs may take the form of information, advice, opinions, alternatives, analyses, evaluations, recommendations, training and the day-to-day aid of support personnel needed for the successful performance of ongoing Federal operations. (*FAR*, 2008)

C. UNIQUE MODELS UTILIZING OTA-CBRTA AND ROSETTEX MODELS

CBRTA and Rosettex are two unique approaches that incorporate the OTA authority to access commercial technologies to provide the Government the best possible innovative solutions on behalf of the National Technology Alliance (NTA).⁷ Both were awarded a procurement agreement by the NGA (executive agent of the NTA) to address certain technological needs. For CBRTA, it focused on chemical, biological and radiological aspects. As for Rosettex, those areas are geospatial intelligence, information processing, analysis and management, and digital technology infrastructure (National Technology Alliance, 2006, pp. 2-3). The OTA agreement provides “streamlined and rapid contracting...less than 30 days from draft SOW to being on contract is not unusual” (About CBRTA Members, 2008, p. 2).

The processes incorporated by each model vary significantly, but may lead to production opportunities. The CBRTA model incorporates a two-process approach, which are Independent Assessment and Evaluation, and Technology Research, Development and Prototyping Activities and Special Studies (OTA Agreement between CBRTA and NGA, 2007, p. 10).

In the past, the CBRTA program effectively leveraged the OTA authority to other Governmental agencies (e.g., Center for Disease Control, Environmental Protection Agency, etc.) for conducting CBR-related R&D and prototyping (L. Clarke, personal communication, April 9, 2008). This enabled various Governmental agencies that do not possess the OTA authority to access the processes of acquiring commercial technologies under an established structure.

⁷ The NTA was created as an intelligence community program to provide the government access to technologies from commercial industry focusing on dual-use technology where cost-sharing can be attained (National Technology Alliance, 2006, pp. 1-2).

Under an OTA agreement, the CBRTA incorporates a strategic alliance approach consisting of 13 companies⁸ dedicated to developing and enhancing commercial technologies by leveraging existing IR&D from these companies (National Technology Alliance, 2006, p. 3). The companies perform specialized functions such as concept development, R&D, product integration, production, and so forth. With product development and commercialization function, the transition opportunity exists under *FAR* Part 12 and Subpart 13.5.

Like CBRTA, the Rosettex process involves two distinct processes: it first focusing on an extensive evaluation and assessment effort; and it then transitions to the next process which consists of “prototyping (via an OTA agreement), product development, commercialization, technology insertion, and systems integration” (*Ibid.*, p. 2). This process is also relevant to partnerships with various industry and academic partners to include traditional and non-traditional firms (See Table 6). According to its website, Rosettex “manages a team of more than 75 leading information technology (IT) organizations seeking solutions to the U.S. Government’s diverse and demanding IT needs” (Rosettex Website: About, 2008).

D. SUMMARY

This chapter provides potential options available to transition a prototype to production or follow-on services. Two different models incorporating OTA authority are also presented. The CBRTA and Rosettex approaches provide rapid and streamlined processes to obtain innovative technologies from the commercial industry. With these different transition opportunities identified, the researchers can apply this information to the survey and interview questions. The questions and surveys are discussed in Chapter IV.

⁸ Members include BD Technologies, Black & Veatch Special Projects Corp., CUBRC Inc., Cargill Inc., General Dynamics Advanced Information Systems, Honeywell International Inc., John Hopkins University Applied Physics Laboratory, LGS Innovations LLC, 3M Company, RAE LLC, Syracuse Research Corporation, and Cipher Systems (OTA Agreement between CBRTA and NGA, 2007, pp. 2-5).

Table 6. Rosettex Partners Segregated by Process Function (From: Rosettex Website: Our Team, 2008)

Our Team		
Independent Needs Analysis and Outreach, Technology Assessment and Evaluation		
<ul style="list-style-type: none"> • Ashland Institute • BearingPoint • Cipher Systems • Gartner • KENTIA Management Corporation • Potomac Institute • Sullivan-Haave • Swiftsure Spatial Systems • SYNTEK Technologies • The SPECTRUM Group 		
Technology Research and Development and Prototyping		
<ul style="list-style-type: none"> • Applied Minds • Atinav • BBN Technologies • Carnegie Mellon University • Center for Higher Learning • George Mason University • Georgia Tech Research Institute • Midwest Research Institute • Mississippi Enterprise for Technology • Mississippi Space Commerce Initiative • Motorola • Penn State University Applied Research Laboratory • Purdue University • Rockwell Scientific Company • Sarnoff Corporation • Southwest Research Institute • SRI International • Thirteen/WNET New York • University at Buffalo, State University of New York • University of Florida • University of Illinois Urbana – Champaign • University of Southern Mississippi • User Systems • Virginia Polytechnic Institute & State University • West Virginia University 		
Product Development and Commercialization		
<ul style="list-style-type: none"> • Aquilent • Brilliant Media • Cambridge Display Technology • Cree • DigitalGlobe • ESRI • Fortrex Technologies • HP Invent • ImageLinks • InPhase Technologies • Iridian Technologies • Leica Geosystems GIS and Mapping • Magfusion • Microlab • ObjectFX • Observera • PacketVideo • Saffron Technology • Scyld Computing Technology • Semandex Networks • Terabit Corporation • Teranex • The Boeing Company • Trimble • U.S. Display Consortium • Vexcel Corporation • Virage • Wavexpress 		
Technology Insertion and System Integration		
<ul style="list-style-type: none"> • Applied Signal Technology • Booz Allen Hamilton • Computer Sciences Corporation • EER Systems • General Dynamics • IBM Consulting • Intergraph Corporation • Lockheed Martin Corporation • Northrop Grumman – TASC • Open Source • Radiance Technologies • Raytheon • SAIC • SMI Defense Group • Titan Systems Corporation • Unisys Corporation 		

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IV. DATA ANALYSIS

A. INTRODUCTION

The intent of the current OTA legislation focus is to attract non-traditional firms to participate in prototype weapon systems with new technologies that improve capability and reduce life-cycle costs, along with providing opportunities to transition to production. Therefore, it is important to analyze the experiences from firms that have conducted OTA agreements with the DoD to improve the business environment. In the meantime, the transitioning opportunities are examined to further understand the obstacles faced by participants. This study seeks to understand what clauses in the OTA legislation and statutes attract these firms to conduct business with the Government. More importantly, the study seeks to discover what can be done by the Government to improve business conditions and bring commercial technology into the military.

This chapter is intended to answer the following research questions:

- To what extent have transition opportunities been made available to and utilized by non-traditional firms to extend their completed prototype under the OTA to DoD production?
- What aspects of the OTA attract the non-traditional firms to do business with the Government?
- What are the transitioning opportunities experienced by the non-traditional firms that have conducted OTA agreements?
- What are the transitioning opportunities available and used by DoD officials?
- What are the barriers, if any, encountered by the non-traditional firms that limit transitioning opportunities?

B. BACKGROUND

1. Methodology

a. Survey

Electronic surveys (See Appendix C) were conducted on a sample set of firms that have utilized OTAs to assess the OTA program's efficacy and to also determine if follow-on production opportunities were afforded after the completion of the OTA. The questionnaire was developed after an extensive literature review of previous relevant OTA studies. The researchers used a self-administered, online survey approach to collect data. The pretest survey was reviewed for content by three DoD contracting officials, with two having broad knowledge and experience on OTAs. Feedback from pretest respondents was used to modify and clarify the wording and format of the survey items.

The researchers did not have direct information of each company's officials who entered into OTA agreement with the DoD. To contact these individuals, the researchers obtained points of contact via the companies' public relations phone lists or submitted e-mail requests through their websites. Once contact information was obtained, the researchers called or e-mailed these company officials and asked them to complete the survey. In some very successful instances, the researchers asked for further information beyond the survey, such as providing greater insight on their respective experiences, which are presented in Section E. The individuals were given more than two weeks to complete the survey.

The survey was designed to allow the respondents the opportunity to answer freely where answers to the survey questions were optional and could be omitted at the respondents' discretion. The multiple choice questions provided for a "non-applicable" answer option if none of the existing choices met their intent. Besides, the survey ensured anonymity; therefore, the respondents could feel free to answer these questions without being identified or subject to possible retribution for any comments

provided. Though some respondents had called or e-mailed back to clarify some of their questions or answers, the researchers protected their anonymity.

Survey questions 1 and 2 were designed to acquire demographic information of the respondents. Survey questions 3-5 were designed to identify what functions in the OTA attracted the non-traditional firms to do business with the Government. Survey questions 6-7 were designed to determine if a competitive environment existed for the respondent's OTA. Survey questions 8-10 were designed to identify what transitioning opportunities available under *FAR* and *DFARS* were considered by the non-traditional firms, while question 13 was designed to know what other follow-on plans the respondents had besides producing for DoD. Survey questions 11-12 were designed to identify what the DoD approach toward transitioning the OTA. Lastly, survey questions 14-15 were designed to identify their satisfaction level toward the OTA experience and other observations not covered in the survey.

b. Interview

Interviews were conducted to understand the transitioning opportunities and issues perceived by DoD officials and consultants. Methods of face-to-face interviews, telephone interview, and email correspondence were used. The researchers requested to conduct interview with three DoD officials and two consultants, all having broad experience and knowledge in OTAs.

Face-to-face interviews were conducted with three DoD officials because of their broad knowledge and experience in contracting and OTA-related matters. Telephone interviews with email correspondence were conducted with two Government consultants. The questionnaire was developed after an extensive literature review of previous relevant OTA studies. The interviewees were sent a copy of the interview questions via e-mail in advance of the interview. The interviewees enjoyed complete discretion as to which of the questions they would answer.

c. Other Insights Provided

In the course of soliciting general information on OTAs and initiating survey or interview requests from DoD and industry, certain individuals provided information in phone conversations, and consented to having the information transcribed to be included into this research thesis. The information is presented as “Other Insights Provided” in Section E of this chapter.

2. Participants

a. Survey

To analyze the transitioning opportunities for non-traditional firms, a survey was conducted on firms who have conducted OT agreements in recent years. The researchers selected firms that entered into agreement from FY2001-FY2005 since previous research (Gilliland, 2001) has conducted survey on companies that entered into agreements with DoD from FY1994-FY2000. For the purposes of this research, the non-traditional firms identified as potential candidates for survey included both the prime and partner companies since privity of contracts is not relevant to OTA as traditional FAR-based contracts. The 2007 LMI report classified 124 companies as non-traditional on new prototype awards on the basis of Reports to Congress (FY01-FY05) and with their professional judgment (pp. E8-E14). Of the 124 companies listed in the LMI report, only 79 firms were contacted via phone contact or email. Some companies could not be contacted because they had either been acquired by other firms, contact information was unavailable, or the names provided were too general and could not be narrowed to a specific firm. Another seven non-traditional firms from the CBRTA who also conducted OTA work during this timeframe were contacted.

The number of survey responses reached a total of 15. The response rate is 17 percent. Self-administered surveys typically have a relatively low response rate, often less than 30 percent (Ruane, 2005, p. 124). The reasons for a low response rate were companies elected not to participate in the survey; and survey did not reach companies’ contracting officials.

b. Interview

Questions & Answers were derived from interviews between one OSD Senior Contracting Staff [SC]; two DoD officials experienced in OTAs [DO]; John Ablard [JA], Senior Research Fellow at LMI;⁹ and Lawrence Clarke [LC], Program Support Manager for the National Technology Alliance’s CBRTA.¹⁰ The DoD and OSD officials requested their names and organization affiliation to be excluded for this research and that they be identified by the respective acronyms mentioned above. The face-to-face interview with the two DoD officials [DO] was conducted on March 26, 2008. The phone interviews and email correspondence with Mr. Ablard [JA] were conducted on April 2, 2008, and with Mr. Clarke [LC] on April 8, 2008.

C. SURVEY DATA ANALYSIS

1. Demographic Information

To understand the business background of the respondents, the first two survey questions were designed to determine both the size and type of their business. Question 1 asked:

“How would you characterize the size of your business?”

All respondents answered this question, and the results are displayed in Table 7. The business size may have affected the company’s desire and willingness to conduct business with the Government. Fourteen of the fifteen respondents identified themselves as a small company; the remaining respondent categorized the business as a medium-sized company.

The type of business is an important factor in understanding the survey results, since the intent of this survey is to understand the transition opportunities for non-traditional firms. The second survey question asked respondents to categorize the type of their business with multiple answers and free input allowed. Question 2 asked:

⁹ See Appendix D for Mr. Abelard’s personal biography.

¹⁰ See Appendix E for Mr. Clarke’s personal biography.

“What is the nature of your firm's business?”

All respondents answered this question and the answers are displayed in Table 7. Thirteen of the respondents identified themselves as non-traditional defense companies (excluding the two respondents who answered traditional defense contractors). Also, more than one-quarter of the respondents were in the business of private research. The two respondents who categorized themselves as traditional defense contractors did so even though the researchers used academic sound judgment to define non-traditionals. This may be due to the definition provided by legislation of what a “non-traditional” contractor is. The researchers believe that the original definition of a non-traditional contractor from Congress as codified in Title 10 USC 2371 presents a narrow interpretation, as stated below:

A business unit that has not, for a period of at least **one year** prior to the date of the OT agreement, entered into or performed on (1) any contract that is subject to full coverage under the cost accounting standards prescribed pursuant to section 26 of the Office of Federal Procurement Policy Act (41 U.S.C. 422) and the regulations implementing such section; or (2) any other contract in excess of \$500,000 to carry out prototype projects or to perform basic, applied, or advanced research projects for a Federal agency that is subject to the Federal Acquisition Regulation (OT Guide, 2000, p.7).

Nonetheless, the survey had successfully attracted non-traditional defense companies to participate in this survey. The survey results are believed to represent the majority of the non-traditional (including commercial and small) companies who entered into OTA with DoD.

Table 7. Demographic Information of the Respondents

Size of Business	Counts	Percentage
Small	14	93%
Medium	1	7%
Large	0	0%
Total	15	100%
Type of Business (multiple responses allowed)		
Non-Traditional Defense Contractor	8	53%
Commercial	9	60%
Private Research	4	27%
Traditional Defense Contractor	2	13%
Non-Profit/Not for Profit	0	0%

2. Reasons for Entering into an OTA

So what brings these non-traditional firms to enter into OTA agreements with the DoD? Competitive procedures shall be used in carrying out these OTA agreements, but *FAR*-based procurement rules do not apply. To find out what motivates respondents to conduct business with the DoD, the researchers developed survey question 3, which asked:

“How was the OTA initiated?”

All respondents answered this question, with the results displayed in Figure 12. Almost 50 percent of the OTAs were in response to DoD solicitations. Interestingly, one-third of the OTA agreements were approached by DoD proactively. More surprisingly, 13 percent of the respondents were allowed to promote their innovative ideas to DoD. This is a very important aspect of OTA, which exposes the Government to a greater range of opportunities to cutting-edge technologies where innovation is “pushed” beyond what is being sought by DoD.

The non-traditional firms approached by the researchers also include the partner firms (sub-contractors). Therefore, one respondent (7 percent) answered that it was approached by the prime contractors to take part in the OTA project. Unlike the standard

role of subcontractor, this aspect of OTA potentially allows the non-traditional firms to participate to a significant degree since they are a potential source of innovative ideas.

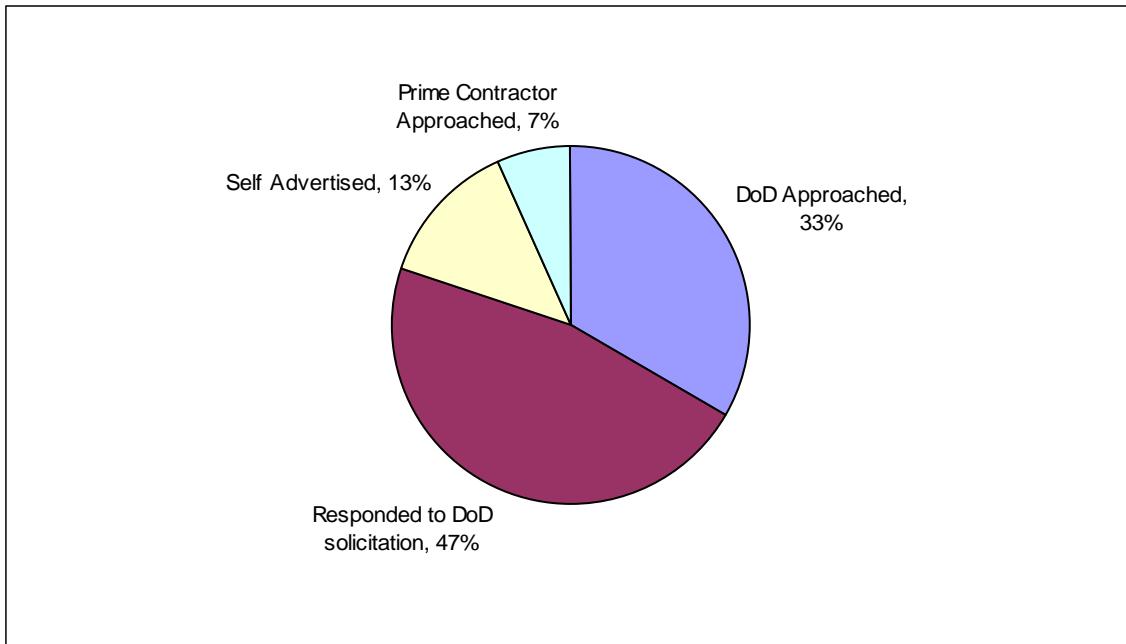


Figure 12. Initiation of the OTA

The non-traditional firms would not do business with the Government without some lucrative incentive or rationale. To know what attracts these companies to enter such agreements, survey question four was designed to find out the reasons behind it. Question 4 asked:

“What was the PRIMARY incentive for entering into the OTA with DoD?”

All respondents answered this question and the results are displayed in Figure 13. More than 50 percent of the respondents said the biggest incentive was to bypass onerous Federal regulations. The next primary incentives selected by the respondents were the availability of Government funding and the IP rights consideration. The last primary incentive was the potential further business with the DoD, which was selected by one respondent (7 percent).

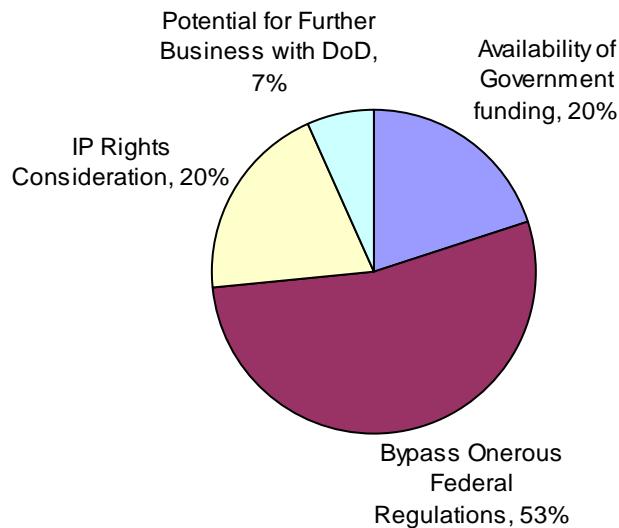


Figure 13. Primary Incentive for Entering into OTA

The results of this survey question coincide with a general belief that OTA gives DoD the opportunity to streamline the procurement process by using innovative commercial business practices as reported in RAND, GAO reports, etc. Such instruments also provide the DoD with the opportunity to broaden its technology and industrial base, fostering new relationships and, in turn, supporting national security strategy.

Upon determining the primary incentive that attracts non-traditional firms to enter into OTA agreements, it is also worth finding out what their other (secondary) incentives are. Survey question 5 asked:

“What were OTHER incentives for conducting business with the DoD?”

All respondents answered this question with the answers displayed in Table 8. This question allowed respondents to provide multiple answers. The rationale for this question was to find out what are the secondary incentives in attracting these non-traditional firms to conduct business with the DoD. The ranking of these other incentives should not be the same as the primary incentives. The No. 1 secondary incentives that

most respondents chose were availability of Government funding, and potential for further business with DoD, with each chosen by 60 percent of the respondents.

It is understandable that a company's primary objective is to maximize profit. Therefore, companies that normally do not conduct business with the Government would be willing to develop new business relationship if the Government could streamline the acquisition process by eliminating certain burdensome regulations. The perception of onerous Federal regulations was shown to be the main reason (Figure 13) why many non-traditional firms are unwilling to do business. And since OTAs help streamline acquisition, the non-traditional firms would now consider conducting business with the DoD since it creates opportunities for funding, and potential business with DoD for those firms where the possibilities were limited or did not exist prior to the OTA arrangement.

Table 8. Other Incentives for Entering into OTA

Other Incentives	Counts	Percentage
Availability of Government Funding	9	60%
Potential for Further Business with DoD	9	60%
IP Rights Consideration	5	33%
Bypass Onerous Federal Regulations	3	20%
Ability to Subcontract to Non-Traditionals	1	7%

3. Competitive Requirement

Agreement officers and program managers are encouraged to use competitive procedures when entering into prototype agreements, per DoD's *OT Guide for Prototype Projects* (2000). To evaluate if competition is an aspect encountered by non-traditional firms, researchers asked questions to determine if the OTAs were competed, and, if so, how they were competed. This is an important aspect of OTAs since competition may exist when requests (Broad Agency Announcements) are initially publicized to attract potential firms, and also during the OTA process if there is sufficient competition to evaluate the program at three phases: Concept Definition, System Development, and Transition to Service.

To understand how many of the OTA were competed, survey question 6 asked:

“Were any of the OTAs competed?”

All but one respondent answered this question. The answers are displayed in Table 9. More than 85 percent of the respondents answered that the OTAs were competed. This high competitiveness rate suggests that OTAs are attracting competition from non-traditional firms (and even traditional defense contractors) to participate. This benefits DoD since increased competition can provide better results with the prototyped weapons systems, and better pricing of the awards with more participation.

With the survey results showing 86 percent of the OTA as competed, it was of interest to the researchers to find out if those OTAs were competed and evaluated at various incremental stages. Analyzing such information would help readers to understand the degree of competitiveness during the development of prototype. Survey question 7 asked:

“Were the OTAs competed and evaluated at various incremental stages?”

The results are also displayed in Table 9 (shaded area). All the 12 respondents who answered “Yes” in the previous survey question answered this follow-on question with the results showing that 50 percent of all respondents (less the one respondent who skipped this question) were competed and evaluated at incremental stages.

Table 9. Competition in the Award of OTA

Was the OTA Competed		Counts	Percentage
NO		2	14%
YES	Competed & Evaluated at Incremental Stages	7	50%
	Not for Incremental Stages	2	14%
	N/A	3	22%
Total		14	100%

4. Transitioning Opportunity

Government and Congress realized the importance of not having the sufficient transition opportunities for the prototype weapons systems developed under the OTA. In

addressing this issue Congress enacted Section 822 (Public Law 107-107) in December 2001. This legislation provided providing new language for awarding follow-on production contracts for OTA if the following conditions are met: competitive procedures are used in the selection process; a prototyping project is completed; and a predetermined number of units along with pre-specified target price in the follow-on production adhered to the terms and conditions of the original OTA.

The researchers identified five options available that could transition an OTA for follow-on work (production or services). These include: (1) *FAR* Part 15, (2) *FAR* Part 12, (3) *FAR* Subpart 13.5, (4) *FAR* Subpart 37.2, and (5) *DFARS* Subpart 212.70.

To understand the realities that these commercial companies are facing regarding the transitioning issue, survey question 8 asked:

“Upon completion of the prototype under OTA, was there a plan to transition the prototype to Federal Acquisition Regulation (*FAR*) acquisition? (transition is defined as having production plans for DoD upon completion of OTA)”

All respondents answered this question, and the results are displayed in Table 10. Surprisingly, only 20 percent of the respondents expressed a desire to transition the prototype to *FAR* acquisition. This low percentage suggests a potential barrier for transition or alternative follow-on plans outside of DoD for successfully developed OTAs.

Table 10. Plan to Transition to *FAR* After Completion of OTA

Plan to Transition to <i>FAR</i>	Counts	Percentage
Yes	3	20%
No	12	80%
Total	15	100%

To further explore the transitioning opportunities for companies that successfully completed OTAs, survey question 9 asked:

“Under which *FAR* type acquisition was the prototype intended to transition?”

The results are displayed in Table 11 with three respondents who answered “Yes” in the previous question providing a response. Of the three respondents, one answered

that their company intended to use “negotiated contract” (*FAR* Part 15), another indicated “no comment,” and the third chose “not applicable” in the answer. Unfortunately, the responses do not explain why the two respondents put “no comment” and “not applicable.”

Interestingly, none of the respondents chose commercial acquisition, commercial acquisition using SAP, or the pilot program for transition established by Congress as their answer. Questions 12 and 13, Interview Data Section and Other Insights Section, of this Chapter provide greater information from DoD and Industry on why these transition opportunities are not being utilized.

Table 11. Transitioning Plan After Completion of OTA

Transitioning Plan	Counts	Percentage
Negotiated Contract (<i>FAR</i> Part 15)	1	33%
Commercial acquisition (<i>FAR</i> Part 12)	0	0%
Commercial acquisition utilizing Simplified Acquisition Procedures not to exceed \$5.5 million (<i>FAR</i> Part 13.5)	0	0%
Pilot program for transition to follow-on contracting after use of OTA (<i>DFARS</i> 212.70)	0	0%
No comment	1	33%
N/A	1	33%
Total	3	100%

AAS aspect under *FAR* Subpart 37.2 for follow-on opportunities was treated as a separate question, since it involved potential services contract as opposed to the production focus in Question 9. Hence, question 10 was designed to understand the usage of such clause by non-traditional firms, which asked:

“Did you provide any consulting services (*FAR* Part 37.2) to DoD concerning the developed prototype?”

All respondents answered this question, and the results are displayed in Table 12. Of the three respondents who had plans to transition to *FAR*, none provided AAS to DoD. This shows that the answers from these respondents were accurate because there would be no AAS needed if the OTA could be transitioned into *FAR*-based acquisition. The

important results that needed attention were those 12 respondents who did not plan to transition to *FAR*-based acquisition. Four out of the 12 respondents (33 percent) answered that they provided AAS to DoD. This is a very important finding from the OTA transitioning perspective, since non-traditional firms that could not or did not desire to transition to follow-on production acquisition could still have the opportunity to participate and provide professional advice from the successfully developed OTA prototypes or future weapons systems that may require their expertise.

Table 12. Advisory and Assistance Services Provided to DoD

Not Planning to Transition to <i>FAR</i>	AAS Provided to DoD	Percentage
12	4	33% (4/12)

After completing the OTA, the non-traditional firms can take the developed prototype projects and produce for commercial opportunities. To assess this, survey question 13 asked:

“Were there other follow-on plans for your prototyping?”

The results are displayed in Table 13. The respondents were allowed to choose multiple answers or input other choices that were not listed. Of the 15 respondents, one did not answer this question and another respondent wrote that their OTA was to study the feasibility of a project and would require no follow-on plan (provided support function to OTA project).

Eleven of the 13 respondents who answered the question (85 percent) selected conducting “Further in-house R&D” following the OTA. More than three-fourths of the respondents said they wanted “Commercial Development” following the OTA. Interestingly, the results from this question correlate highly with results from question 4, where the primary incentive for firms to conduct OTAs was to bypass onerous Federal acquisition regulations, with the second primary incentive being funding purposes.

Table 13. Other Follow-on Plans Besides Government Business. Multiple Answers Allowed

Follow-on Plans	Counts	Percentage
Further in-house R&D	11	85%
Commercial Development	10	77%
License to another firm	0	0%

5. DoD's Position Toward Transition

Understanding DoD's position toward transitioning was deemed an important aspect for successful transition. Survey questions 11 and 12 were designed to understand DoD's attitude toward transitioning as perceived by the respondents.

Survey question 11 asked:

“Did the DoD agency or service encourage you to transition the OTA for further production or development?”

All respondents answered this question with results displayed in Table 14. Only five of the respondents (33 percent) felt that DoD encouraged them to transition the OTA for further production or development.

Table 14. If DoD encouraged to Transition for Further Production/Development

Transitioning Plan	Counts	Percentage
Yes	5	33%
No	10	67%
Total	15	100%

Question 12 further asked:

“Did you experience any barriers for follow-on development/production with DoD?”

Again, all respondents answered this question with results displayed in Table 15. Six of the respondents (40 percent) experienced barriers for follow-on development/production with DoD.

Table 15. Experience of Barriers for Follow-on Development/Production with DoD

Barriers for Follow-on Development/Production with DoD	Counts	Percentage
Yes	6	40%
No	9	60%
Total	15	100%

Four out of the six respondents who selected a “Yes” answer also provided explanations for barriers experienced with the OTA as shown in Table 16.

Table 16. Barriers Cited by Respondents

Respondent	Barriers Cited
1	Just the standard barriers on all Government contracts. Too much paper and inflexible and uncooperative Defense Contract Audit Agency.
2	USAF pulled out of agreement in violation of terms of joint Memorandum of Agreement with DARPA.
3	We were just a very small sub to a larger prime on this effort. Our support work was entirely analytical for the Phase 1 FALCON-Hypersonic Cruise Vehicle project.
4	I bid on related contract but was not given proper consideration. From what I understand, the person in charge of the DoD acquisition was later found guilty & went to jail favoring the "traditional" DoD contractor but award was given to another "traditional" DoD contractor and my company was never even notified of the outcome even though I reported the individual to Pentagon officials. The incident pretty much wrecked my business and I elected never to deal with DoD again.

6. Experience by OTA Participants

OTA has been a great tool for DoD to access the commercial technology that has outpaced the military-specific technology. Many successful prototypes have been developed under OTA, which now plays an important role in military technology development. It is therefore of great importance to assess the experiences of OTA participants who have conducted business with DoD. Survey question 14 is designed to understand all aspects of business relationships experienced by the respondents.

Specifically, the question let the respondents express their experience from five different aspects. These aspects include: (1) organizational interface; (2) business process employed by DoD; (3) protocols well defined; (4) DoD employees knowledge and ability; and (5) overall experience. Survey question 14 asked:

“Please rate your experience with DoD in the OTA business”

All respondents answered this question, and the results are displayed in Table 17. Responses to questions were anchored using a five-level satisfaction scale (i.e., terrible, unsatisfied, neutral, satisfied, and excellent).

Table 17. Experience with DoD in the OTA business

Experience with DoD in the OTA business:	Terrible	Unsatisfied	Neutral	Satisfied	Excellent
Organizational interface	0 0%	2 13%	1 7%	9 60%	3 20%
Business process employed by the DoD	2 13%	1 7%	3 20%	7 47%	2 13%
Protocols well defined	0 0%	4 27%	4 27%	4 27%	3 20%
DoD employees knowledge & ability	2 13%	2 13%	3 20%	6 40%	2 13%
Overall experience	2 13%	1 7%	4 27%	6 40%	2 13%

Further, to examine trends in satisfaction, the answers from the respondents are put into chart form, which is shown in Figure 14. An easy way to measure the satisfaction is to calculate the satisfaction differential by subtracting the bottom two box scores—the combined percentage of those saying their experiences were unsatisfied and terrible—from the top two box scores (excellent and satisfied). The analysis of satisfaction differential from each category shows Organizational Interface (67 points) and Business Process Employed by DoD (40 points) with the highest satisfaction of the five categories. Protocols Well Defined (20 points) and DoD Employee Knowledge and Ability (27 points) were computed as the lowest two categories. The final category, Overall Experience, was calculated near the middle range with 33 points. This analysis infers that there is a general perception of greater problems associated with the Protocols Well Defined and DoD Employee Knowledge and Ability with OTAs.

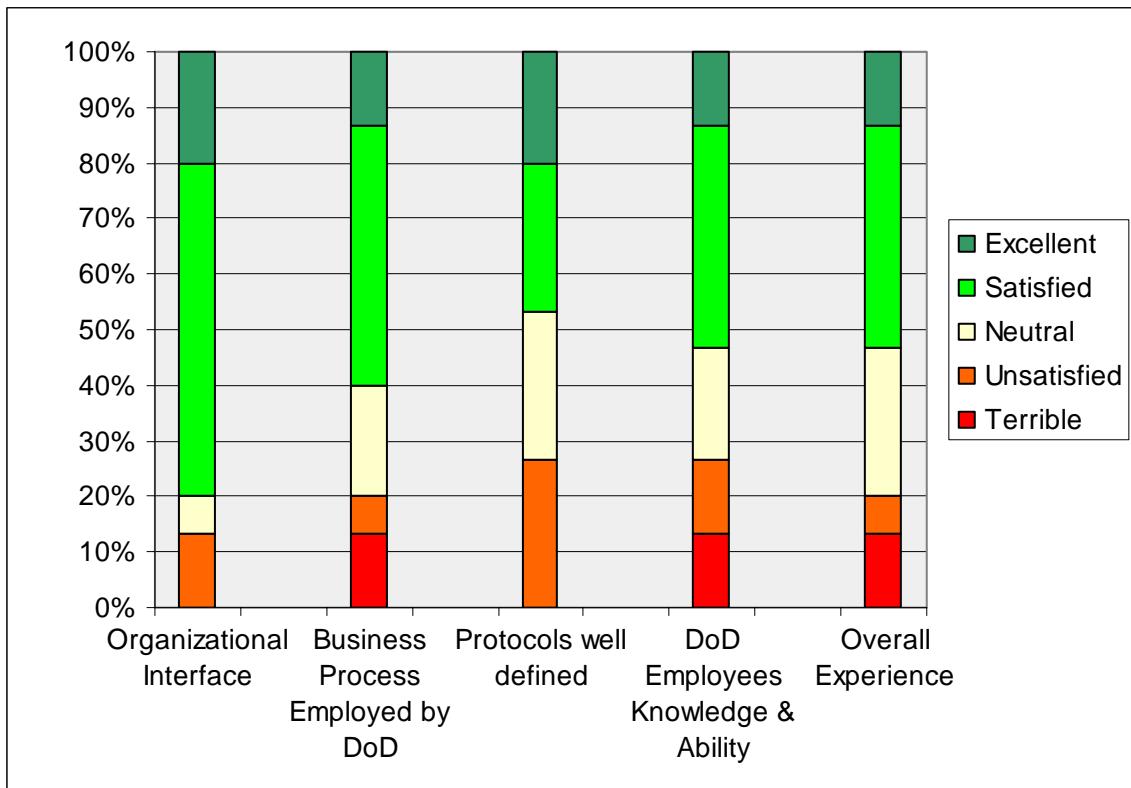


Figure 14. Trends in OTA Satisfaction Score

Question 15 asked the respondents to provide comments that they felt were not covered in the survey. This question was open-ended and allowed the respondents to offer as many or as few comments as they wanted. Survey question 15 asked:

“Do you have any other comments or observations not covered here that you would like to contribute?”

Overall, more negative comments were expressed by the respondents than positive comments. Comments that the researchers felt important are highlighted in bold. Besides, the comments along with previous literature review and study were taken into consideration when developing recommendations in the next chapter.

Table 18. Open-ended Remarks Provided by Respondents

Comments	Do you have any other comments or observations not covered here that you would like to contribute?
Negative	
1	<p>Many Government contracting officers are reluctant to "push the envelope" on OTAs due to fears about being criticized after the fact by auditors and Inspector Generals (IG). Although some agreement officers are proficient in the use of OTAs, this expertise is limited and is not reflected in the general contracting field. In the world of R&D the primary benefit is the relaxed Intellectual Property (IP) provisions that enable contractors to take advantage of firms working primarily in the commercial world where they are very protective of their IP.</p>
2	<p>Criticism (frequently unfair) by the DoD IG and certain members of Congress of DoD's use of OT agreements has made many DoD contracting officials very gun shy regarding the use of OTs. DoD contracting officials are often afraid to agree to use an OT agreement instead of a traditional <i>FAR</i> R&D contract because of fears that they will be later criticized by the DoD IG or Congress. As a result, OTs are not utilized with commercial companies as often as possible. As a result, it is common for commercial companies to decline to perform R&D for DoD when the only tool in DoD's tool chest of funding agreements is a traditional <i>FAR</i> R&D contract. This situation prevents DoD from obtaining access to the latest leading-edge, commercial technologies that would be of great benefit to the warfighter and the national defense.</p>
3	<p>As a small business concern, we would like to see more OTA contracts. We find it very inefficient and painful to participate in programs subject to the <i>FAR</i>. OTA more closely resembles the commercial contracts that we regularly participate in.</p>
4	<p>Two organizations were involved: AFRL & Acquisition. The experience with AFRL was great. In contrast, the business dealing with acquisition was worst experience of my life. I would not wish the same on anyone!</p>
5	<p>Overall a negative experience for our firm and the taxpayers due to USAF incompetence and duplicitousness. In general, Agreement Officers are incapable of effectively using OTAs as Congress intended.</p>
6	<p>This was a pre-dredge program for several beach restoration projects in South Carolina. All work as done using existing capabilities and technologies. We typically perform projects for the Corps of Engineers as a sub-contractor for larger firms with Architectural-Engineering Task Order contracts. The projects in question were solicited primarily due to lack of an existing Task Order and were sent out for competitive bid.</p>
Positive	
1	<p>OTA worked for us and DARPA because they had smart people in a position to make decision quickly on behalf of the Government and therefore could help us as appropriate.</p>

2	We would be happy to provide services to the DoD if there are projects that match our expertise.
3	<p>On the OTA conducted with a major defense contractor (i.e. NGC), we were provided a small amount, \$60K to do support work on the prototype. There was no interface with the DoD entity (i.e. DARPA). But, this did provide us funding to do research and to help grow our business, both in terms of technical capabilities and also making useful contacts within NGC. In contrast, we also participated in the DARPA RASCAL project on a team that involved Coleman, PanAero, and other companies, and that one did provide us with the opportunity to meet DARPA and DoD officials directly. As a small start-up company, this was great for us as it provided “face time” with the Government. It would have been nice to have had the same opportunity on the FALCON project. This project was competed with other firms, and our joint team was down-selected out of Phase 2. But, I believe DoD's competitive, sequential down-select process is good for us and business in general.</p>
3	<p>We have done some other work for DoD, primarily with the Air Force and found conducting business with cost-type contracts can be burdensome. Having to provide cost information and provide justification to DCAA can add significant administrative work load to a small business to the point where the cost of doing business with DoD exceeds the benefits. As a growing business, direct and indirect rates change rapidly, and having to track these changes and justify bid rates and incurred costs to the Government (DCAA) takes away from the primary goal of our company. Administratively, it is much easier for us to bid and support firm fixed price contracts compared to cost-type contracts.</p>
Neutral	
1	Our assistance consists of prototyping that allows the respective agency to evaluate emerging technologies from DoD suppliers. They are using equipment in their prototypes that we have already internally developed and privately funded.
2	Regarding transition of the OTA to another mechanism, our firm wasn't privy to those discussions. They would have taken place with the prime contractor. Our small award was just a fixed-price effort under them.
3	Use of the OTA was helpful. Development stoppage was not due to OTA difficulties but instead due to change of DoD direction which is reasonable.

D. INTERVIEW DATA ANALYSIS

Below interviews are comprised of feedback relevant to this research directly from DoD officials and consultants. These individuals all possessed significant work experience and knowledge in OTAs. The interview questions focused on five main areas which are transitioning issues, current transition opportunities, DoD's position toward transition, trend in OTA usage, and comments for recommendations provided by interviewees.

1. Transitioning Issues

“Presently, Other Transaction Authority for the Development of Prototypes (OTA) does not extend into the production phase of the Acquisition Lifecycle. Has this hindered non-traditional and commercial firms from participating in the OTA process? Why or why not?”

[SC] No, companies will tend to produce to prove a concept performing under an OTA, especially if there is enough incentive regardless of the ability for follow-on production with DoD. The initial incentives are economic, DoD dollars available for the OTA. Part of the problem is the company does not have to participate with DoD. But, by participating in an OTA, they are able to leverage Government resources (e.g. funds, expertise, etc.).

[DO] No, the very successful OTAs have been bought out by traditional defense companies. For example, the Frontier Systems was bought out by Boeing after the technology was successfully proved under the OTA. Same goes with Global Hawk when Teledyne Ryan Aeronautical was bought by Northrop-Grumman. So, the production aspects were transitioned to Boeing and Northrop-Grumman who have the capability and means to produce under *FAR* guidelines. There was no need for non-traditional companies in these two cases to transition into production when a large, traditional defense contractor can buy them out. However, a company may not want to transition to production. Take commercial firms whose incentive is the dual technology where there is a commercial payoff and would like to leverage funding and resources from DoD through the OTA. The DoD market may represent only 5 percent of the total market for these firms; therefore, there is little drive to try to transition an OTA for production using *FAR* Part 12 or 13.5. Often these commercial firms will have a commercial product that will be sold as a commercial item.

[JA] No. They are excited about getting the Government's investment to pursue projects that they do not have the resources to pursue on their own. They could also be thinking of a huge commercial market in the future; but, they recognize that with the

Government's investment and their own, they can push the technology along the trail to maturity. In my experiences, the reason large commercial companies are in fact with the Government at all (whether it is a *FAR*-based contract or an OTA) is because of the Government resources that are being provided.... Anytime they can get somebody else to share in some of their development costs, it is in their interest. The reason why they would want to pursue the OT for prototype is because now all of the requirements in the *FAR* where the procurement laws do not apply, and that gives them greater flexibility dealing with their own firms.

[LC] With the change some years back allowing low rate production of finished prototypes under the OT, it has not been a problem for CBRTA to date. I assess it would be a problem for a product like the Counter Radio Controlled Improvised Explosive Device Electronic Warfare (Improvised Explosive Device Jammer) which was developed by one of our alliance partners but not under the CBRTA OT agreement.

”In your view, do you believe a successfully developed prototype under OTA fulfills acquisition milestones B & C? If yes, why doesn’t DoD apply OTA for all weapon development programs (this would help improve cost performance schedule for issues that currently plague our programs)?”

[SC] There is potential for fulfilling Milestone B/C if the project is properly document with appropriate data. Global Hawk prototype completed under an OTA was transitioned to the Air Force. It then underwent two years of ‘Engineering and Manufacturing Development’ before it was given production approval.

[DO] In some sense, they do. It can if you have commercial companies driving the entire process without Government giving direction. They can make the best value trade-offs in a particular program.

Some barriers to this process are: lack of understanding, no requirement for training, leaving it up to services to decide what is appropriate. The services are very large vice DARPA, which is comprised of 200 personnel. Therefore, it takes much greater scrutiny, time, and bureaucracy to review and approve OTA in the services. At the same time, the services also change the inherent process to make it more in their image using a number of *FAR* and *DFARS* clauses; therefore, the OTA features are lost in the process.

[JA] Generally, I do not believe that OTAs should be used to fulfill weapon acquisition milestones B or C. When a program gets that big, you will be dealing with traditional, defense contractors. In regards to non-traditionals to a significant extent is less and less. I really believe OTAs are before that, to try things out, to build a few, to test to determine if it works. Once a decision is made that it works, then you think about applying it to a major milestone under DoD 5000.1 and 5000.2. There are too many issues with big ‘A’ acquisitions under DoD 5000.1, 5000.2, and the associated regulations that make it a slow, prodding process. OTAs are great to prove concepts, but should not be a replacement for Milestone B or C if there are great quantities involved.

2. Current Transition Opportunities

“In your experience, what transition options under *FAR* regulations have been used to assist non-traditional firms enter into the production phase after completion of the OTA? To what extent have these been utilized? What about *FAR* Parts 12, 13.5, 37?”

[SC] An example is the Global Hawk prototype where Teledyne Ryan Aeronautical was purchased. If you are a small company with a successful product like the Global Hawk prototype completed by Teledyne Ryan Aeronautical, a large defense contractor will acquire your business.

[DO] Successfully developed OTAs have been bought out by large, traditional defense contractors. As for *FAR* Part 12, I have twice tried using [it] to acquire commercial services for R&D, but it is awkward and often very difficult to establish commercial labor rates from companies that typically perform research for other companies. It is much easier using an OTA. As for *FAR* Part 37, companies can also offer their services via GSA service contracts to provide technical services to the Government in follow-on efforts after the OTA is completed.

[JA] The transition depends on the nature of the program. The most logical method for commercial firms to transition a prototype project into a *FAR*-based contract is *FAR* Part 12. If that project had major elements that were of large, traditional contractors, then the transition path is *FAR* Part 15. For many of the larger projects that DoD has done, that is the applicable means of transition. They were led by large, traditional defense contractors with non-traditional defense contractors playing a significant role somehow; and then when it came time to go into traditional acquisition, the large, defense contractor was not afraid and took his *FAR*-based contract and was happy.... *FAR* Part 13 is about small purchases with a test plan of \$5.5 million. I do not see anyone smart enough to use that. If they have, I am not aware of it. *FAR* Part 37, I do not ever remember seeing anything like that as services....

The biggest problem when transitioning from an OTA into *FAR*-based requirement is competition requirements. That is what the *DFARS* Subpart 212.70 is trying to solve. It is saying if competition was done, knowing the quantities and prices established up front, then there is no need to re-compete for transition. Note, full and open competition may exist at the beginning of the OTA process (anybody can compete), but ‘full and open’ does not apply because they are outside the procurement statutes. For example, a way to conduct a *DFARS* Subpart 212.70 is to establish the target quantity to be purchased when the prototype enters into production. The target price will also be established in the original OTA. The companies will then go through the development process and complete all tests to show it does work. The Government then has the option to buy that amount of items at a fixed price, without further competition in accordance with this regulation. However, the real problem is the Government does not want to enter into one of these if there is little development going on; but, for a commercial company, it would be hard to commit to a price on an item that has not been developed yet. But, the idea is to get around the competition issue. For the Government who has invested a

great deal of money into an OTA (whether commercial or traditional), it provides an option to having to initiate a ‘justification and approval’ or ‘full and open’ competition process.

[LC] I am not personally aware of any *FAR* actions in this area. Most of our commercial companies flee the *FAR* because of all the baggage it carries and most Government contracts for CBR related items are small compared to commercial sales.

“Are there non-*FAR* options available (e.g. COSSI¹¹)? What are these? Have these been utilized?”

[SC] COSSI was a good program when it was live.

[DO] Successfully developed prototypes are usually bought out by another company. COSSI was popular during the Clinton administration as a way to help save money on operating costs.

[JA] If you are going to buy in quantity, you must use the *FAR*...In the COSSI program, the whole idea was to attract commercial off-the-shelf items. There were many of those projects that did use *FAR* Part 12 as their transition tool. A number of those used Part 15 because it was replacing commercial variant software for the F-15 fighter.

3. DoD’s Position Toward Transition

“How would you comment on Department of Defense’s (DoD) success to enable non-traditional firms in transitioning a completed OTA for follow-on production opportunities? What do you think are the limiting factors?”

[SC] Mergers allow non-traditional firms to transition a prototype since large defense firms have the ability to produce under *FAR*.

[JA] That is the biggest problem with OTA. If DoD wants it very bad, they will pay someone to deliver it. It might cost \$200 million more and add an additional three years for somebody else to get up to speed as the non-traditional. That is the first thought. The second thought: All of the problems of making the switch (i.e., the competition requirement of the *FAR*). The reason it is such a big deal is timing and time because if a decision is made to re-compete after the prototype is done; then it will require a statement of work, source selection plans, initial solicitation, source selection evaluation, and make an award. So, six to nine months go by. Will the traditional player keep their team together that made these prototypes? What happens to that capability or interest if it takes nine months to make a decision? That is the real problem.

¹¹ Projects improving the performance of existing military systems, while incurring cost savings by infusing commercial technologies is referred to as the Commercial Operations and Support Savings Initiative (COSSI)

[DO] When a traditional defense contractor adopts commercial like qualities, it results in becoming faster and cheaper for the Government. It requires a behavior-like change for defense industry. But, there is a cost associated with implementing change. Are these (traditional defense) companies willing to change age-old practices? Take Raytheon for example. To accommodate the OTA process early on, Raytheon created its own commercial subsidiary, and stated that they saved some 50 basis points in overhead costs in doing so. We wanted them to change their behavior and become more commercial, but most companies would prefer to remain *FAR* compliant.

[LC] I am sure there have been success but I opine they are few and far between. The Government does not recognize the failure of the *FAR* to reach out to commercial companies and even when they do their answer is always modify the *FAR* (e.g., FASA, FARA) to accommodate this particular circumstance. It is time the Government recognizes that to reach out to the best minds and the latest technology requires a new way of doing business.

4. Trend in OTA Usage

“What is your assessment of the OTA usage in the near future for DoD and other agencies and the effects toward non-traditional firms?”

[SC] Current legislation drives the need for large defense firms to use non-traditional firms or cost sharing. So, most firms would rather partner with non-traditionals as a result (Note, non-traditionals must contribute significantly to the OTA). This requirement adds additional time and cost to the OTA process. It is important to note the use of non-traditional firms in OTAs is highly favored by Congress.

[DO] Not in big favor currently, though the authority was recently extended for another 3 years. The political buy-in is not there. A change in administration may deem it appropriate or not, depending on which candidate wins the election.

We would like more participation from commercial and non-traditionals at primarily the prime contractor level although we tend to see their participation at the subcontractor level. Traditional contractors still like OTAs and compete for these arrangements and often using the strategic alliance of non-traditional firms at the sub level.

[JA] More agencies should be using it; not only DoD, but also civilian agencies. The reason why OTAs are not being utilized is because there is a lack of education, lack of interest, and it does require the technical guys to think different and look for commercial solutions. Most of them are not trained to do that either.

[LC] With the draft guidelines that are provided by DoD right now, fewer companies will work with the DoD. I opine the utility of the OT will diminish to a point where its use will decrease and probably eventually not be used. Few contracting officers and legal personnel in DoD really understand OTA and therefore view it as a threat. They have grown up with the *FAR* and the normal list of DoD contractors and are happy where they are.

5. Recommendations and Comments

“Do you have any recommendations to improve the transitioning process for non-traditional firms?”

[SC] Non-traditionals have to conform to *FAR*-based clauses. An example is Boeing. They were primarily a commercial plane company that created a military division to be able to conduct business with DoD. Note, Boeing utilized a lot of resources to gain compliance.

“Do you have any other comments or observations that you would like to contribute?”

[SC] OTAs are a great tool. We don't want to lose this ability that provides the best arrangements for Government and industry since they provide benefits to both sides. For industry, it allows them a 'foot in the door' to establish an inside track for future DoD projects. There is a perception that [there is] no incentive to maintain the OTA program since the authority has no permanence. The Section 845 has to be renewed by Congress every certain period. Also, there are few individuals who are qualified in contracting to perform and execute OTAs.

[DO] OTAs have not taken off for a number of reasons. First, OTAs have been heavily criticized by the Inspector General (IG) because it wanted unrealistic auditing and oversight for non-traditional firms. These stringent requirements were simply not acceptable to these firms. A great deal of time has been spent on responding to IG inquiries. We are in the operations side of contracting. To respond to IG concerns means taking considerable time away from doing the job...A *FAR*-based contract is much easier to defend, because it is done by the book. There is also the perception that there are not many safeguards associated with OTAs, yet sound business judgment from competent contracting officers has to be employed. The Future Combat Systems scandal also damaged the OTA reputation. As a result, legislation added new requirements and layers to OTA approval making the process more difficult...The more scrutiny on the OTA program, the less likely companies will want to participate.

[JA] The big concern is the usage of OTs even at DARPA is down. There are less and less people using them. There are less and less program managers who understand how to use them. When you look at statistics, there is a great deal of usage early on with lots of money. Now, there are very few done and by few people. This certainly is an observation.

[LC] The initial OTA was developed by DARPA to get to the right people fast who did not meet any of the *FAR* requirements. These are wonderful requirements (*FAR*) for the bureaucrat who wants to feel secure but it does little to take the risk necessary for major R&D advances. For OTA to truly develop into an outreach tool for Government:

- Tear up the emerging DoD OTA guidelines. They will kill any OTA program. What contractor will bring any of his R&D to Government if their investment to date cannot be counted for cost-share?
- Expand the OTA to include production up to 100,000 units of OTA developed prototypes.
- Encourage Government teaming in the use of the OTA with agencies not currently using the OTA, being able to team with an OTA agency without any level of funding restrictions.
- Allow creativity by OTA agencies to get the most money to the end R&D developer. For example, CBRTA does not contract directly with Universities. Their load fees are abusive.
- Allow the OTA to accept grant money. Currently OTA is not allowed to accept grant money and that is where significant R&D is being done.

E. OTHER INSIGHTS PROVIDED

The following information was based on notes transcribed from phone conversations with two individuals in industry who are experienced in OTAs. A follow-on email requesting consent to use their comments for this paper was forwarded. These individuals provided consent, but with the following conditions: The first industry official **[IO]** declined to have his name or company identified in this paper. The second individual, Richard Kuyath **[RK]** is a general counsel in private industry who requested to include a disclaimer that the opinions expressed in this paper are his personally and not attributable to the company that employs him. Their comments are available in Appendix F. Comments most relevant to this research are provided below:

[IO] We are still conducting the same amount of OTAs, but now with non-DoD sources such as the Department of Homeland Security. Other departments are also gaining use of OTAs.

[RK] Commercial firms have to deal with intense pressures globally and from Wall Street to perform. As a result the addition of high cost, Government-unique systems to enable the commercial firms to comply with Government-unique contract requirements is often not a priority when the commercial firm's total Government business may be as little as one percent of the firm's total annual sales

[RK] OTAs provide flexibility for commercial firms to bypass Government-unique contract requirements under the Federal Acquisition Regulation (*FAR*), Defense

Federal Acquisition Regulation Supplement (*DFARS*), and Cost Accounting Standards (CAS). Commercial firms have little business incentive to implement expensive systems that will enable them to comply with these Government-unique contract requirements, which will add significant cost to be borne in part by their commercial business. These added costs will make them less competitive in the commercial marketplace where as much as 99 percent of their revenues are derived.

F. SUMMARY

This chapter examines many aspects of the OTA operating environment with the focus on the transitioning opportunities for non-traditional firms. A survey and interviews were used to explore the reasons why private industry enter into an OTA, the competitive requirement, the current transitioning opportunities, DoD's position toward transition, and the experience by OTA participants. The interview process and comments provided from phone conversations were used to collect in-depth information on the transitioning perspective. Specifically, the data from interviews included transitioning issues, current transition opportunities, DoD's position toward transition, trends in OTA usage, and recommendations and comments from various Government and industry officials.

The analysis from both the surveys and interviews indicate difficulties by firms in achieving transitioning opportunities for production with DoD from a completed prototype. From the industry perspective, the firms surveyed disclosed no intent to transition and identified barriers that excluded these opportunities. This view was supported by interviews and personal insights that private industry (non-traditional firms) is interested more in commercial development and production that can result in greater profitability potential. Nevertheless, survey respondents confirmed some follow-on activity with DoD through the use of AAS.

As a result, the final chapter examines the problems associated with the transitioning issue by interpreting views from both the DoD officials and persons in the commercial sector.

V. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The purpose of this research was to explore the opportunities available for non-traditional companies to transition their completed prototype projects for follow-on production based on legislation created by Congress and statutes outlined under *FAR* and *DFARS*. This chapter presents conclusions, recommendations, and answers to the research questions initially asked in Chapter I. In closing, the researchers suggest areas for further study.

B. CONCLUSIONS

A number of significant findings can be drawn from the responses to surveys and interviews summarized in Chapter IV. The principal findings are described below.

1. Transition Alternative

Mergers provide an alternative to transitioning for extremely successful developed prototypes from an OTA. Two examples were provided from the interviews with DoD and OSD officials: The A-160 Hummingbird and Global Hawk Unmanned Aerial Vehicle. Both OTAs were competed and awarded to non-traditional firms via a multi-phase, down-select approach that included competition from large defense contractors. However, the success of these non-traditionals resulted in them being acquired by large traditional firms. Frontier Systems, the developer of the Hummingbird prototype, was bought by the Boeing Company. The developers of Global Hawk, Teledyne Ryan Aeronautical, were purchased by Northrop Grumman Corporation. Both prototypes were able to be transitioned into production under *FAR* Part 15 contract after being bought by large, traditional defense contractors who had the ability to comply and produce under *FAR* and CAS.

2. Negative OTA Experiences Shared by Respondents of Non-traditional Firms

A significant portion of respondents viewed the performance of DoD officials (26 percent) and protocols (27 percent) of the OTA process as negative (Terrible or Unsatisfied rating) from the survey results. In addition, open-ended comments from the survey provided some insights to their experiences: (1) the acquisition process of OTA as “worst experience of my life,” (2) the overall negative experience attributed to the agreement officers’ incompetence, and (3) the observations that agreement officers’ performance is constrained due to scrutiny from members of Congress and DoD IG. DoD officials and Mr. Kuyath also shared the same concerns regarding Congress’ and IGs’ criticism that has paralyzed those who manage and execute OTA agreements.

C. RECOMMENDATIONS

1. Revise Current OTA Transition Legislation Under *DFARS 212.70*

The requirements that authorize the ability for non-traditional contractors to transition a completed prototype under *DFARS 212.70* must be revised to eliminate the conditions that unrealistically call for the predetermination of price and quantities in the original OTA agreement before the prototype is actually completed. These criteria would be difficult for agreement officers and the non-traditional firm to determine since standard contract requirements such as cost or pricing data are not mandated due to the nature of OTAs. It adds a great amount of risk to the program if prices and quantities cannot be accurately predicted since the development of the prototype has not been completed. In the interview with Mr. Ablard, he states:

To conduct a *DFARS* Subpart 212.70 is to establish the target quantity to be purchased when the prototype enters into production. The target price will also be established in the original OTA...The Government then has the option to buy that amount of items at a fixed price, without further competition in accordance with this regulation. However, the real problem is the Government does not want to enter into one of these if there is little development going on; but, for a commercial company, it would be hard to commit to a price on an item that has not been developed yet. But, the idea is to get around the competition issue.

Even if the terms and conditions can be agreed upon for the prototype development, the matter of funding the follow-on production needs to be planned and integrated. There are too many unknowns and risks associated with this transition option.

2. Make OTA a Permanent Authority

The researchers recommend that the OTA authority granted by Section 845 be made permanent. One reason is the need to resolve the lack of agreement officers who are qualified and trained, confirmed by the relatively low satisfaction levels from respondents regarding DoD officials' knowledge and experience. The constant renewal of OTA authority (done every three-five years) suggests a low commitment to learning or applying OTAs. Yoder (2006) identifies the same problems associated with *FAR* Part 13.5, where the temporary authority has created problems with contracting activities hesitant to support the regulation and reluctant to provide resources to "train and structure the [acquisition] workforce and associated protocols" (p. 98). Without any long-term relevance associated with OTAs, there will be no commitment to provide for training, given the limited resources in DoD.

3. Optimize Opportunities under CBRTA OTA to Other Agencies

This study revealed a lack of experienced and knowledgeable agreement officers by both industry and DoD officials; therefore, one possible short-term solution would be allowing authorized agencies to extend their OTA authority to support other Government organizations.

One example where this has been utilized was under the CBRTA Model that has provided opportunities for others without the authority or ability to attain innovative technologies. This is an effective means of sharing OTA, given the lack of qualified contracting personnel throughout the Government. For the same reason, the authority should not be arbitrarily granted across all Government agencies, given the potential abuse by those who are not qualified.

D. ANSWERS TO RESEARCH QUESTIONS

The following provides answers to the questions initially proposed by researchers for the purpose of this study, related to analyzing the transition opportunities afforded to non-traditional firm who have conducted OTA prototyping.

1. To What Extent have Transition Opportunities been Made Available to and Utilized by Non-traditional Firms to Extend Their Completed Prototype under the OTA to DoD Production?

The opportunities appear to be limited for providing transition to non-traditional firms via various *FAR* and *DFARS* statutes for completed prototypes. Although transitioning under *FAR* Part 12 and Subpart 13.5 seems to be a logical option available to bypass certain procurement regulations calling for oversight and cost data, none of the officials interviewed recalled using these statutes for transitioning (the exception cited was the COSSI program, which is no longer an active DoD program). The example with EELV to use an OTA to develop a prototype with further production from *FAR* Part 12 contract using commercial acquisition illustrates a transition barrier that the anticipated commercial market does not realize (See Chapter III). The *DFARS* 212.70 authority created by Congress specifically outlined transition opportunities to non-traditional firms, but was not used due to reasons highlighted in Chapter III. However, one-third of survey respondents did perform AAS for follow-on work with the OTA prototype, despite not having any initial plans to transition. Two DoD officials recommended that companies submit AAS via the GSA to advertise technical services to the Government in follow-on efforts after the completed OTA.

2. What Aspects of the OTA Attract the Non-Traditional Firms to Do Business with the Government?

Industry perspective suggests that the primary considerations for entering into an OTA with DoD are to gain funding for R&D projects, including potential dual-use technology or products, without being subject to inflexible treatment of IP rights and regulations associated with standard procurement. For the majority of these firms, the follow-on intent was to conduct further in-house R&D and produce for the commercial

market, with the majority having no plans to transition, even though the production aspect would provide the firm greater business from DoD. The interviews confirmed this view from industry, stating that the profit motive is far greater in the commercial market. Two interviewees stated that profit from DoD may represent less than 5 percent of total revenues. At the same time, transitioning may incur compliance cost with a *FAR* Part 15 contract. According to Mr. Kuyath, “These added costs will make them less competitive in the commercial marketplace, where as much as 99 percent of their revenues are derived.”¹² The decreased profit potential and added cost burden (e.g., from CAS) are valid reasons that deter non-traditional firms from pursuing follow-on production opportunities.

3. What are the Transitioning Opportunities Experienced by the Non-Traditional Firms that have Conducted OTA Agreements?

About one-third of respondents indicated that DoD encouraged the transition of the OTA for further production or development. It is unknown whether DoD was able to assess projects for potential transitioning before the prototype was completed, and whether this affected results to question 11 of the survey. But, one industry representative shared his thoughts:

The reason why small (non-traditional) innovative companies do not want to transition to production is that the process may require a large defense contractor’s production capability. But, in doing so, the small firm risks compromising proprietary data to another traditional firm. This is a genuine fear of many small innovative companies. (Anonymous, personal communication, May 13, 2008)

4. What are the Transitioning Opportunities Available and Used by DoD Officials?

When DoD officials were asked to provide their assessment of transitioning opportunities, different answers were provided. The DoD and OSD officials stated that

¹² Disclaimer: Mr. Kuyath’s opinions expressed in this paper are his personally and not attributable to the company of his employment.

mergers allowed large traditional firms to transition prototypes developed by non-traditionals under *FAR* Part 15. Two examples are Global Hawk UCAV and the Hummingbird A-160 projects.

5. What are the Barriers, if any, Encountered by the Non-Traditional Firms that Limit Transitioning Opportunities?

The survey results show that 40 percent experienced barriers for follow-on development work or production with their OTA prototype. Four comments were provided, identifying the following causes: the standard barriers (e.g., too much paperwork) associated with all Government contracts; the uncooperative nature of Defense Contract Audit Agency; the unilateral termination of an OTA agreement; and improper practices by contracting officials. The researchers interpreted these comments to be related to barriers in the OTA process and not relevant to transitioning.

E. FURTHER RESEARCH

Several topics should be further examined. First, the basic should be evaluated for allowing a firm's IR&D to be allocated toward cost-sharing. This issue was introduced by the IG in a 1999 Audit Report, stating that IR&D funds should not be included as part of the cost-share requirement (See Chapter II). However, the Department of Homeland Security Guidebook on OTAs permits IR&D to be included as part of the cost-share: "IR&D costs incurred in preparing, submitting, and supporting offers on potential OTAs also are allowable to the extent they are allocable and reasonable" (2005, p. 1-5). Additionally, from a conversation with an industry official who had conducted an OTA with DoD comes this experience:

Prior to the OTA, our company invested millions of dollars in time and costs to produce the technology to date. When the government entered the OTA with us, they were able to get the technology on the cheap. However, we were able to get additional funding from the OTA to enhance our technology for the government and against our competitors. (Anonymous, personal communication, April 10, 2008)

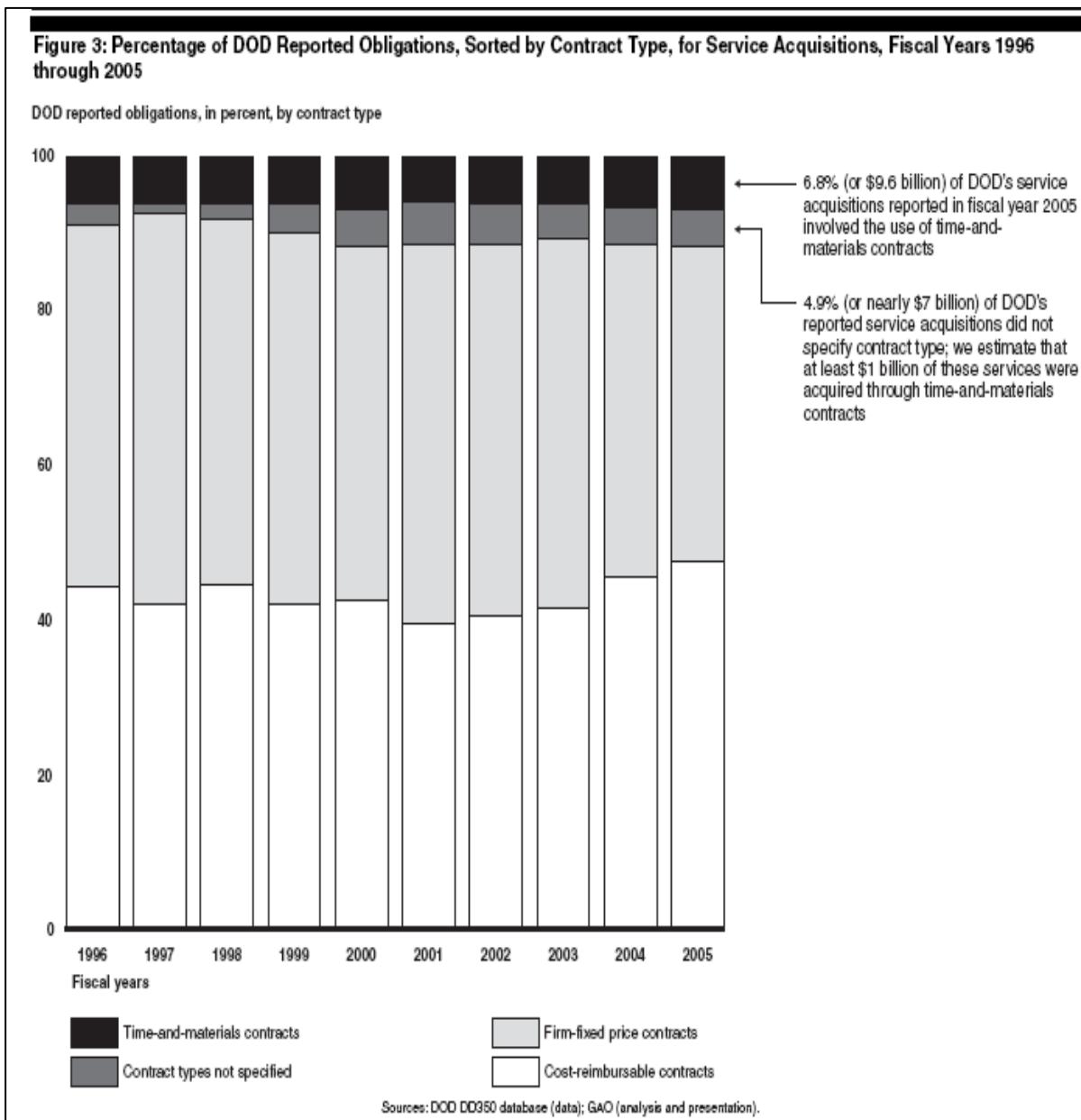
In the course of this study, different standards were applied to determine what actually defines a non-traditional firm as opposed to the standard provided by Congress

per Public Law 106-398. Existing statutes would automatically designate a firm to be traditional if it entered into an OTA or contract subject to CAS where the amount of the award exceeds \$500,000. This could preclude many non-traditional firms from doing business with DoD to one agreement or contract per year, thereby limiting competition and the availability of DoD to access commercial technology.

In conclusion, the researchers suggest the above topics to be examined further. The researchers hope the study has provided the readers with extensive knowledge on the background of OTA, the transitioning opportunities along with recommendations to further improve the authority.

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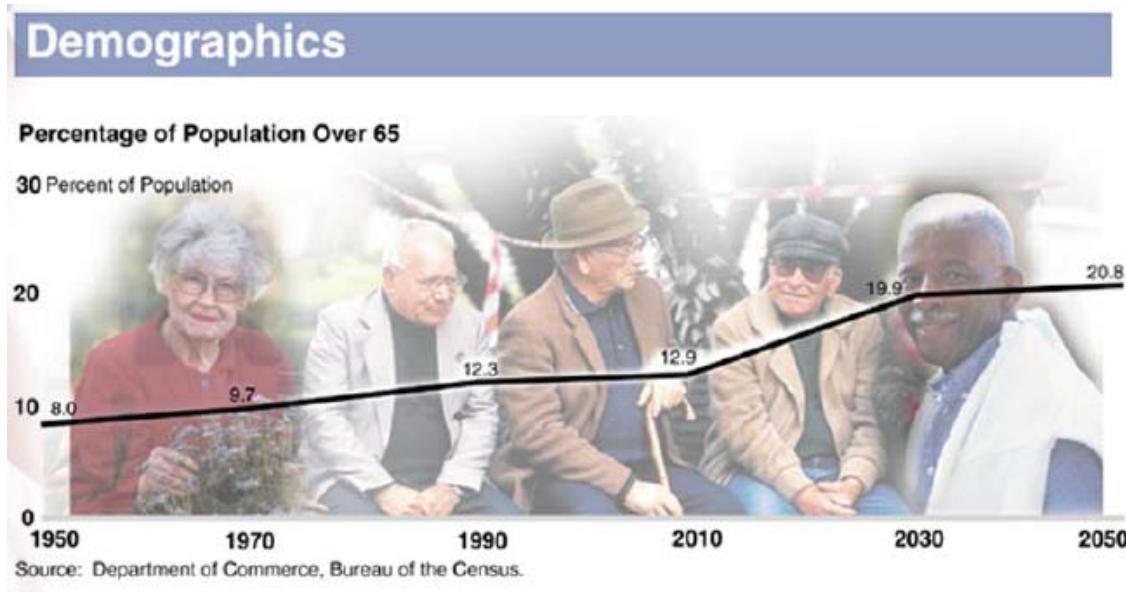
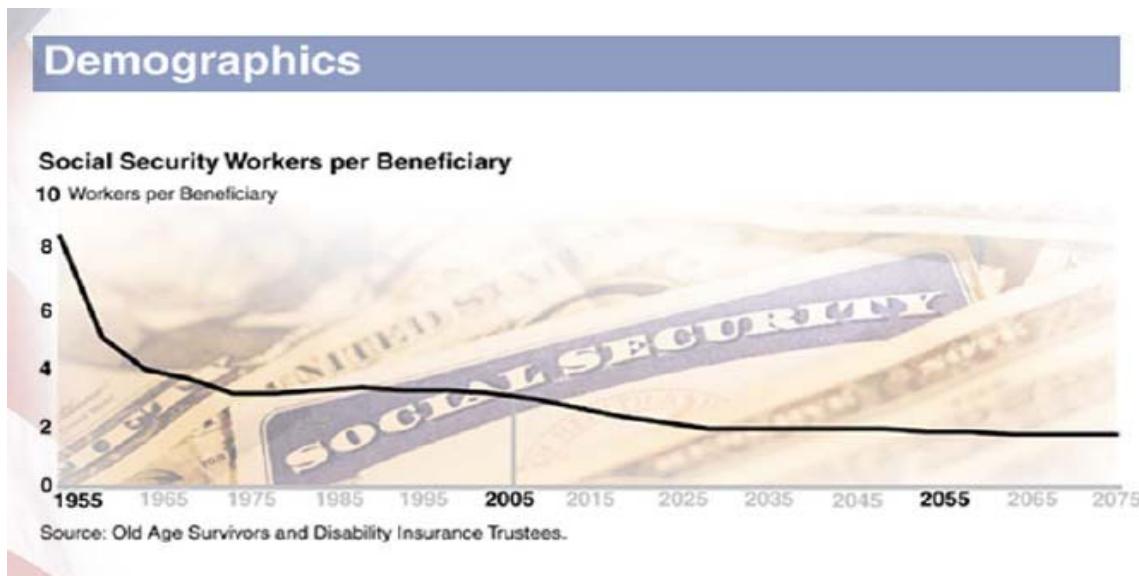
APPENDIX A. PERCENTAGE OF DOD REPORTED OBLIGATIONS BY CONTRACT TYPE IN FY1996-FY2005



(From: Defense contracting improved insight and controls needed, 2007, p. 12)

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APPENDIX B. GRAPHS SHOWING PROJECTED AGING POPULATION AND SHRINKING WORKFORCE



(From: Walker, slides 14-15)

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APPENDIX C. SURVEY FOR NON-TRADITIONAL COMPANIES



Other Transaction Authority (OTA) Business with Department of Defense (DoD)

You are invited to participate in a thesis study titled "Analysis of Current Other Transaction Authority (OTA) for Non-Traditional and Commercial Firms"

The purpose of this survey is to explore the opportunities for non-traditional and commercial companies to jointly conduct weapon systems prototype development with DoD via OTA. The researchers believe the results would benefit both the DoD and the industry. Your feedback is important to us.

Agreement and Consent:

If I agree to participate in this study, I understand I will be provided with an explanation of the purpose of the research, a description of the procedures to be used, and the expected duration of my participation. The questionnaire will consist of 15 questions and will require approximately 5-15 minutes to complete.

I understand that this project does not involve greater than minimal risk and involves no known reasonably foreseeable risks or hazards greater than those encountered in everyday life. I have also been informed of any benefits to myself or to others that may reasonably be expected as a result of this research.

I understand that no tangible compensation will be given. I understand that a copy of the research results will be available to view at the conclusion of the survey.

I understand that my privacy will be safeguarded. No information will be publicly accessible which could identify me as a participant.

I understand that my participation is strictly voluntary, and if I agree to participate, I am free to withdraw at any time without prejudice.

Points of Contact:

I understand that if I have any questions or comments regarding this project upon the completion of my participation, I should contact the Investigator, LCDR James Wong (US Navy) at jywong@nps.edu. Any other questions or concerns may be addressed to the IRB Chair, LT Brent Olde, 656-3807, baolde@nps.edu.

Statement of Consent:

I have read and understand the above information. I have asked all questions and have had my questions answered. If you agree to complete the survey please click the "Start Survey" button.

START SURVEY!

1 How would you characterize the size of your business?

- Small
- Medium
- Large

2 What is the nature of your firm's business? (Mark all that apply)

- Non-Traditional Defense Contractor
- Commercial
- Private Research
- Non-Profit/Not for Profit
- Other, please specify

3 How was your OTA project(s) initiated? (Mark all that apply)

- DoD approached
- Responded to an advertised DoD solicitation
- Other, please specify

4 What was the PRIMARY incentive for entering into the OTA with DoD?

- Availability of government funding for the project
- Bypass onerous federal regulations
- Proprietary consideration over technical data/patent rights
- Potential for further business with DoD
- No comment
- Other, please specify

5 What were OTHER incentives for conducting business with the DoD?
(Mark all that apply)

- Availability of government funding for the project
- Bypass onerous federal regulations
- Proprietary consideration over technical data/patent rights
- Potential for further business with DoD
- No comment
- Other, please specify

6 Were any of the OTAs competed?

If yes, out of how many were competed OTAs (e.g. 1 out of 2 were competed)?



7 Were the OTAs competed and evaluated at various incremental stages (e.g. Concept development, research, etc.)?

- Yes
- No
- N/A

8 *Upon completion of the prototype under OTA, was there a plan to transition the prototype to Federal Acquisition Regulation (FAR) acquisition? (transition is defined as having production plans for DoD upon completion of OTA)

SUBMIT

9 Under which FAR type acquisition was the prototype intended to transition under? (Mark all that apply)

- Commercial acquisition (FAR Part 12)
- Commercial acquisition utilizing Simplified Acquisition Procedures not to exceed \$5.5 million (FAR Part 13.5)
- Negotiated Contract (FAR Part 15)
- Pilot program for transition to follow-on contracting after use of OTA (DFARS 212.70)
- No comment
- N/A

10 Did you provide any consulting services (FAR Part 37.2) to DoD concerning the developed prototype?

11 Did the DoD agency or service encourage you to transition the OTA for further production or development?

12 Did you experience any barriers for follow-on development/production with DoD?

please comment

13 Were there other follow-on plans for your prototyping? (Mark all that apply)

- Commercial development
- License to another firm
- Further in-house research and development
- Other, please specify

14 Please rate your experience with DoD in the OTA business:

1 Terrible	2 Unsatisfied	3 Neutral	4 Satisfied	5 Excellent
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5
1	2	3	4	5

15 Do you have any other comments or observations not covered here that you would like to contribute?

Thank you for your participation.

SUBMIT

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APPENDIX D. BIOGRAPHY OF MR. ABLARD

JOHN H. ABLARD

Mr. Ablard is a Senior Research Fellow at Logistics Management Institute (LMI); a non-profit government research and consulting firm. He is a renowned expert in agreements with industry and consortium under the acquisition and non-acquisition special authorities granted by 10 USC 2371, and other non-procurement instruments. He continues to lead development and utilization of these new techniques through his active participation in government's leading-edge projects.

Mr. Ablard performs outreach activities, including but not limited to policy interpretation and practical lessons learned sessions with the military components, other executive agencies and industry. He works closely with senior officials throughout the DoD and industry to examine and recommend changes as appropriate, to the extremely complicated laws, regulations, and policies, which impact DoD's ability to contract research and development efforts. He leads teams in conducting complex management and technical studies in all aspects of the acquisition process. He designs and facilitates continuous process improvement efforts and works with the DoD to identify and bring commercial best practices into government acquisition organizations.

In his thirty-three year acquisition career, Mr. Ablard achieved the Senior Executive Service, and has worked for each branch of the military services. He has received the Navy Meritorious Civilian Service Award and two DOD Exceptional Civilian Service Awards. He is a member of the National Contract Management Association.

Employment History:

1968 – 1978	Various DOD Activities including with USA/USAF in Europe
1978 – 1990	Naval Research Laboratory, Washington, DC Senior Acquisition Professional Head, Contracting Division
1990 – 1997	Defense Advanced Research Projects Agency, Arlington, VA Deputy Director, Contracts Management Office
1998 – 1999	Director, Office of Management Operations
1999 – 2000	Special Assistant for Acquisition and Transition
2000 – Present	Senior Research Fellow, LMI

Education:

BA History & Political Science, Ottawa University
MS Human Resources Management, University of Utah

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APPENDIX E. BIOGRAPHY OF MR. CLARK

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Security Clearance

TS/SCI; SBI date 8/31/2006 : last CI ploy 7/2001

Education

- Naval Postgraduate School *Annual Classified Advanced Technology Update Short Course (EC-4900)* April 2005, July 2004, July 2003, July 2002; July 2001; March 2000
- Louisiana State University's Center for Advanced Microstructures and Devices (CAMD), *Nanotechnology in Biology, Biotechnology and Medicine Workshop* 2003
- Graduate School U.S. Department of Agriculture *Management Accountability and Control* December 1995
- Defense Intelligence College – 1973-74
- Industrial College of the Armed Forces – 1969
- B.S. Business, Virginia Polytechnic Institute and State University – 1965

Publications:

Science and Technology Initiatives: Consumer Digital C4I Applications 3 Jan 1993 for the Center for Naval Analysis

Experience Summary

Present: **Clarke Consulting, Principal.**

- Consulting agreements as follows:
 - Currently serve part-time as the Program Support Manager for the National Technology Alliance (NTA's), Chemical, Biological, and Radiological Technology Alliance (CBRTA). The National Technology Alliance is a federal government program with the Director of National Intelligence's (DNI) Intelligence Advanced Research Projects Activity (IARPA) serving as executive agent. CBRTA is an Alliance of 13 major U.S. owned corporations and 30+ subcontractors representing over ~\$240B in sales in 2006 and conducting over \$13B in internal research and development that same year. The Alliance includes 3M, General Dynamics (the Alliance government integrator), RAE Inc, Cipher, John Hopkins University's Applied Physics Lab, Honeywell Corporation, Syracuse Research Corporation, Lucent Government Systems (LGS), CUBRC, a University of Buffalo Research Center, Becton Dickinson, Black and Veatch, and Motorola. As Alliance interface with government the task is to identify unmet CBRNE technology needs from across government and match that with existing and ongoing commercial research and development.
 - Consultant on Chem/Bio sensors to commercial firm developing advanced radiation detection technology.

- Board member: Defense Intelligence Agency's (DIA), National Signatures Program (NSP), Advanced Signatures Assessment Board (ASAB).
- Board member: Albany New York's Watervliet Arsenal's Technology Advisory Committee, an extension of New York's Center for Economic Growth.
- Red Team support to defense contractors for proposal vetting.

1997-2006: Clarke Consulting, Principal

Commencing in 2002: Served as the Program Director for the National Technology Alliance's Chemical, Biological and Radiological Technology Alliance. Established the program after the consortium team won the competition, established all initial government contacts, hosted semi-annual Alliance Advisory Group (AAG) meetings for senior government officials to expose them to CBRNE related technologies being developed by commercial industry and not normally available to government in the R&D state.

National Reconnaissance Office: Served as the historical sage and technical advisor to the NRO's Deputy Director for Military Support from July 2001 through March 2006. Awarded the NRO Silver Medal upon retirement, the highest non-government employee award given by the NRO.

- Providing technology consulting services to commercial as well as non-profit companies.
- Maintain a stable of senior, professional consultants to meet the advanced technology and proposal needs of a wide range of customers.

1991 to July 2001: Emergent Information Technology Inc, Program Manager, National Reconnaissance Office, Operational Support Office, Head, Director's Action Group

Led a team of eight senior retired military officers who advised on best commercial practices, interagency communications and cross agency cooperation. Identified emerging and revolutionary data/information technologies. Advisor on policy issues relating to ITAR, foreign release and disclosure of systems and information. Facilitator for USSOUTHCOM for an Interagency Task Force on Force Protection as it relates to Colombia's FARQ. Founding father of Project Einstein (an inductive reasoning engine that manifests some level of computer automation of human cognitive skills). The 1999 recipient of the NRO's *James E. Morgan Memorial Award* for innovative uses of national reconnaissance data.

1989-1991: Director, Navy TENCAP

Authored formal Navy positions on national systems programmatic and system's capability issues. Managed numerous prototypes dealing with the transmission, receipt, processing, and display of national systems data. Maintained close contacts in industry and academe in leading edge technologies in computer science, data display, data processing, lasers, image processing techniques, data compression, automatic target recognition, artificial intelligence, and communications. Hosted the NTA's NML on its first Ops Support visit to the Navy's Strike Warfare Center in Fallon, NV. Creator of the concept and led the first prototype development of the Radiant Mercury Multi-Level Secure Sanitizer and Guard. Defended programs before OMB, OSD, as well as the HPSCI and SSCI. Awarded the Legion of Merit for distinguished contributions to the U.S. Navy.

1986 –1989: Commanding Officer, Fleet Ocean Surveillance Facility, Rota, Spain

Tactical Indications and Warning Center for U.S. and Allied forces operating in the USEUCOM's Southern Region and the Mediterranean Sea. Deployed and certified operationally the first OSIS Baseline Upgrade System (a DCI high interest system). Managed the integration and tactical use of Prototype Ocean Surveillance Terminal (POST); the Advanced Tactical Workstation (ATW); and the Navy Exercise Support Terminal (NEST). Maintained unusually close personal contacts with commercial industry and academia ensuring that the latest innovations in data handling and visualization were available for demonstration and display to U.S. forces supporting operations in USEUCOM's Southern Region to include the Mediterranean and its littoral. Responsible for the concept and prototype development of the Submarine Analyst Workstation (SAW); and the Electronic Collateral Support System (ELCSS). Directed implementation and activation of the first Mediterranean HF NATO Tactical Intelligence Broadcast (NTIB). Served for 3 years on COMSIXTHFLT's Command, Control, and Communications Coordination Committee. Awarded the Legion of Merit for distinguished service to USEUCOM, CINCUSNAVEUR and COMSIXTHFLT.

Professional Societies

Association for Communications, Electronics, Intelligence, and Information Systems Professionals (Life Member)
National Military Intelligence Association (Life Member)
Naval Intelligence Professionals (Life Member)
Named Honorary Navy Cryptologist upon Retirement from the Navy (1991)

Currently serve on the following Corporate and Government Boards:

* Template Software Inc, Fairfax, VA
* Research Analysis and Engineering Inc, Fairfax, VA
* Watervliet Innovation Center, Technology Board of Advisors, Albany, NY (a component of New York's Center for Economic Growth (CEG))
* Defense Intelligence Agency's, National Signatures Program (NSP), Advanced Signatures Assessment Board (ASAB)
* Marcus Pointe Homeowners Association Board of Directors

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APPENDIX F. OTHER INSIGHTS PROVIDED BY INDUSTRY OFFICIALS

The following insights were provided by two industry individuals experienced in OTAs. These individuals provided consent, but with the following conditions: The first individual, Richard Kuyath, is a general counsel in private industry who requested to include a disclaimer that the opinions expressed in this paper are his alone and should not be attributed to the company that employs him. The second industry official declined to have his name or company identified in this paper.

A. BY RICHARD KUYATH:

Other Transaction Authority (OTA) is a critical tool for the DoD and other Government agencies to have to enable them the access to leading-edge technologies from commercial companies whose research & development activities are much larger than DoD.

OTAs provide flexibility for commercial firms to bypass Government-unique contract requirements under the Federal Acquisition Regulation (*FAR*), Defense Federal Acquisition Regulation Supplement (*DFARS*), and Cost Accounting Standards (*CAS*). Commercial firms have little business incentive to implement expensive systems that will enable them to comply with these Government-unique contract requirements, which will add significant cost to be borne in part by their commercial business. These added costs will make them less competitive in the commercial marketplace where as much as 99 percent of their revenues are derived.

Commercial firms have to deal with intense pressures globally and from Wall Street to perform. As a result the addition of high cost, Government-unique systems to enable the commercial firms to comply with Government-unique contract requirements is often not a priority when the commercial firm's total Government business may be as little as one percent of the firm's total annual sales.

Additional benefits to commercial firms from using OTAs pertain to patent rights per the Bayh-Dole Act and data rights per DoD data rights statutes. *FAR* procurement R&D contracts are required by law to comply with the Bayh-Dole Act with respect to rights in inventions developed in performance of work under such contracts. The same holds true with respect to rights in technical data developed in the performance of *FAR* R&D procurement contracts. However, unlike *FAR* procurement contracts, there are no

statutes that dictate mandatory minimum rights the Government must obtain in inventions and technical data developed in the performance of an OTA. Therefore, the parties have complete freedom of contract with OTAs to negotiate rights in intellectual property that make sense for the particular R&D project involved.

An example of DoD's inability to access the latest state of the art commercial technology is Intel Corporation. For a period of time Intel Corporation operated a manufacturing facility dedicated just for Government business to provide electronic components to meet unique military and other Government requirements. However, Intel Corporation eventually discontinued this operation because it was too expensive to maintain, especially when compared to the relatively small amount of business it had with the Government.

The same holds true for companies that develop and manufacture vaccines. Without the ability to negotiate OTA agreements with such companies, the Government would not be able to have new vaccines developed by and procured from these companies for defense against emerging biological warfare threats.

There are currently some problems that exist for employing OTAs: (1) no initiative from top level DoD officials promoting the benefits of OTAs and their increased use to DoD contracting personnel and industry, (2) lack of qualified, experienced and trained DoD contracting officials to negotiate and administer these OTAs, and (3) negative fallout in Congress and the press from reports of allegedly inappropriate use of OTAs with traditional defense contractors. This negative fallout has spilled over onto use of OTAs in general. As a result, DoD contracting officials are often afraid to use an OTA as the funding instrument because of the possibility of later criticism by the DoD IG or Congress. Under these circumstances, DoD contracting officials are often much more comfortable using traditional *FAR* R&D procurement contracts.

There are many high technology, leading-edge, commercial technologies that are either already developed by commercial firms or that could be developed by such firms to provide unique solutions for the military, which can only be provided through use of an OTA. The warfighter needs to be able to be given the latest available, leading-edge, commercial technologies for our national defense.

Bottom line: DoD's use of OTAs with commercial firms appears to have dropped significantly from when OTAs were first introduced. This includes use of OTAs by DARPA, where OTAs were first employed by DoD.

Restrictions and Government-unique contract requirements added by Congress to OTAs as a result of negative audit reports from the DoD IG and criticism by certain members of Congress about allegedly inappropriate use of OTAs with traditional defense contractors have significantly reduced the flexibilities of OTAs and the benefits enjoyed from their use.

Examples of such restrictions and Government-unique contract requirements imposed on OTAs include: (1) those imposed by the DoD Grant and Agreement Regulations (which is a mini-*FAR*) for OT for Research, (2) statutory audit rights by the Comptroller General for OTAs in excess of \$5 million for prototype projects, and (3) mandatory 1/3 cost sharing under OTAs for prototype projects for "traditional defense contractors," which are business units of firms that have either been awarded or have performed a *FAR* R&D contract in excess of \$500,000 during the past year. This extremely broad definition of a "traditional defense contractor" inappropriately sweeps in many commercial firms that may have less than one percent Government business per year.

Inappropriate OTA usage should be dealt with individually, instead of imposing restrictive legislative policy affecting all of DoD and industry.

B. BY ANONYMOUS INDUSTRY OFFICIAL

There is less originality in the way OTAs are now drafted than there use to be. This is attributed to the lack of experienced and trained DoD contracting personnel we come across in conducting OTAs. The OTA authority is very broad in its use, but there is a general reluctance to take greater risks with personnel who do not have the experience or training because they do not have the appropriate level of knowledge to properly execute these agreements. Additionally, there is a concern among contracting personnel about being "second guessed" after the fact by auditors.

OTA usage is also conservative, and this may be a result of the problems with its usage (e.g., Future Combat Systems with Boeing). Again, there is concern among the contracting representatives about auditors/IG coming in after the fact and criticizing them for actions taken at the time of award.

We are still conducting the same amount of OTAs, but now with non-DoD sources such as the Department of Homeland Security. Other departments are also gaining use of OTAs.

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